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1981 CRC OCTANE NUMBER REQUIREMENT SURVEY.(U)
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UNCLASSIFIED CRC-525 DAAK70-81-C-0128
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CRC Report No. 525

(12)

1981 CRC OCTANE NUMBER REQUIREMENT SURVEY

August 1982

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1981 CRC OCTANE NUMBER REQUIREMENT SURVEY

(CRC PROJECT No. CM-123-81)

Prepared by the

1981 Analysis Panel

of the

CRC Light-Duty Octane Number Requirement Survey Group

August 1982

Light-Duty Vehicle Fuel, Lubricant, and Equipment Research Committee

of the

Coordinating Research Council, Inc.

JAAK70-81-C-0128

TABLE OF CONTENTS

TABLES

Page

TABLES *(Continued)* Page

TABLES *(Continued)* Page

FIGURES

FIGURES *(Continued)*

APPENDICES

I. INTRODUCTION

In the 35th annual statistical survey of current model vehicles conducted by the Coordinating Research Council, Inc., test data were obtained on 429 1981 model vehicles, including nine select models of special interest. Maximum octane number requirements at either full- or part-throttle operating conditions were determined. Included also are the octane number requirements as determined by the new 50th percentile acceleration technique designed to more nearly represent customer-type driving. Surface ignition and rumble, if present, were also reported.

Passenger cars and light-duty trucks including non-commercial vans (1/2-3/4 ton without four-wheel drive) were tested according to a weighted distribution. This year's Survey includes analyses of validated data for the following vehicle categories:

(1) US and Imported Vehicles -- 417 vehicles,

(2) US and Imported Cars -- 392 cars,

(3) US Vehicles -- 318 vehicles,

(4) US Cars -- 300 cars, AND

(5) Imported Vehicles -- 99 vehicles.

It should be noted that the term "cars" designates passenger cars only, while the term "vehicles" includes passenger cars plus vans and light-duty trucks.

The order of testing reference fuels was the same as the 1980 Survey, which is as follows:

- Tank Fuel..1st
- High Sensitivity Full-Boiling Range Unleaded (FBRSU) Fuels.......................................2nd
- Average Sensitivity Full-Boiling Range Unleaded (FBRU) Fuels..............................3rd
- Primary Reference (PR) Fuels........................4th

Sixteen laboratories participated in this Survey and submitted data on US vehicles; fourteen of these laboratories also reported data on imported vehicles. Participating laboratories are listed in Appendix A. Members of the CRC Analysis Panel are identified in Appendix B.

II. SUMMARY

A. Vehicles Tested

Data were collected on 429 1981 model vehicles; however, analyses in this report were based on 417 vehicles. Data for twelve vehicles were excluded: six vehicles equipped with knock sensors; five vehicles with less than 4,000 miles; and one duplicate rating. The 417 vehicles included 318 US vehicles and 99 imported vehicles. There were three hundred US passenger cars and ninety-two imported cars. There were eighteen US and seven imported light-duty trucks and vans. The 1981 Survey included a sufficient amount of data for nine specific models which were analyzed separately as select models. Eight of these select model categories had automatic transmissions, and one had manual transmissions. The vehicles used in this program had an average of 10,601 deposit miles. The average production-weighted engine displacement and compression ratio were 2.99 ℓ and 8.50, respectively.

B. Octane Number Requirements

Requirements are expressed as the Research octane number (RON), Motor octane number (MON), and (R+M)/2 octane number of the reference fuel which produced the least audible knock due to either spark or surface ignition, whichever was limiting. Estimated octane number requirements for the US vehicles are weighted in proportion to the 1981 vehicle model production figures and, for the imported models, in proportion to import sales volume in the United States.

For the 1981 Survey, knocking tendency was investigated at maximum-throttle and by a new 50th percentile acceleration technique which essentially replaced the part-throttle procedure used in previous years. Part-throttle requirements were defined only when their requirements were higher than the maximum full-throttle requirements. The new 50th percentile acceleration technique was designed to study octane requirements of vehicles using an acceleration profile representative of average customer driving patterns. The maximum requirements reported for the 1981 Survey were determined by the same method used in prior Surveys (the greater of maximum-throttle or part-throttle).

Maximum and 50th percentile acceleration technique octane number requirements at the 50 percent and 90 percent satisfaction levels for the five sample categories are given in the following table for FBRU fuels.

FBRU OCTANE NUMBER REQUIREMENTS

1981 AND CHANGES FROM 1980

Weighted Population	RON 50% Sat.	RON 90% Sat.	MON 50% Sat.	MON 90% Sat.
Maximum Octane Number Requirements				
All US and Imported Vehicles	90.3	96.1	82.9	86.1
Δ from 1980	-0.5	1.0	-0.6	-0.1
All US and Imported Cars	89.8	95.4	82.6	85.7
Δ from 1980	-0.8	0.3	-0.8	-0.5
All US Vehicles	91.1	96.5	83.3	86.4
Δ from 1980	-0.3	1.0	-0.5	0.0
All US Cars	90.6	95.8	83.0	85.9
Δ from 1980	-0.7	0.3	-0.8	-0.5
Imported Vehicles	89.0	95.1	82.1	85.5
Δ from 1980	0.0	2.5	-0.2	0.9
50th Percentile Acceleration Technique Octane Number Requirements				
All US and Imported Vehicles	88.1	94.3	81.7	85.1
US and Imported Cars	87.7	93.7	81.4	84.7
US Vehicles	89.3	94.5	82.3	85.2
US Cars	88.7	94.1	82.0	84.9
Imported Vehicles	86.9	93.5	81.0	84.6

Maximum octane requirements for the select models at the 50 percent and 90 percent satisfaction levels for FBRU fuels are summarized on the next page.

SELECT MODELS

MAXIMUM FBRU OCTANE NUMBER REQUIREMENTS

Select Model	No. Tested	RON 50% Sat.	RON 90% Sat.	MON 50% Sat.	MON 90% Sat.
HIA 238	14	88.8	92.1	82.0	83.8
IIA 238/LIA 238	30	91.6	97.0	83.6	[illegible]
NCX 228/HCX 228/ ICX 228/ LCX 228	19	85.4	89.3	79.9	[illegible]
NC5 225/HC5 225/ IC5 225/LC5 225	24	92.5	97.6	84.1	[illegible]
OL 216/ML 216	14	92.0	96.6	83.8	86.4
OL 216M/ML 216M	13	91.6	94.8	83.5	85.3
OCA 223/MCA 223	16	90.1	93.8	82.7	84.7
PL 217/KL 217	14	84.5	89.0	79.2	82.6
PC 222/KC 222	24	85.8	91.2	80.1	83.6

C. Maximum Octane Number Requirements at Part-Throttle

Incidence of part-throttle knock with FBRU greater than full-throttle knock was slightly higher in 1981 than in 1980. Maximum requirements occurred at part-throttle in 9.8 percent of all 1981 model vehicles with FBRU fuels, compared with 6.7 percent in 1980.

D. Tank Fuel Knock Reported by Trained Raters

In the 1981 Survey, 42.9 percent of the weighted vehicle population knocked on tank fuel; this compares with 49.9 percent found in the 1980 Survey. More cars in this Survey were found to have premium unleaded gasoline in their tanks at the time they were rated than in last year's Survey. This may account for the lower incidence of tank fuel knock in the 1981 Survey.

E. After-Run on Tank Fuel

Of the 148 vehicles which had owners' reports submitted, the trained raters found 3.4 percent incidence of after-run, while the owners reported 12.2 percent. The raters' lower incidence may be explained by the fact that their report is based on a single test using the fuel in the tank at that time, while the owners have multiple opportunities to evaluate after-run.

F. Surface Ignition and Rumble

There were no reports of either surface ignition or rumble in the 1981 Survey.

G. Road Octane Number Depreciation

Road octane number depreciation of FBRU fuels in the range 88 to 98 RON varied from 0.6 to 2.7, compared with 1.8 to 2.7 in the 1980 Survey. Depreciation of FBRSU fuels in the range 88 to 99 RON varied from 1.6 to 3.3, compared with 3.0 to 4.9 in last year's Survey.

III. TEST VEHICLES

This year's Survey tested a total of 429 1981 model vehicles. Data obtained on six vehicles equipped with knock sensors (knock limiters), five vehicles with less than 4,000 miles, and one duplicate rating were not included in the analysis. The data from the 417 vehicles used in the analysis included 392 passenger cars (three hundred US and ninety-two imports) and twenty-five non-commercial vans and light-duty trucks (eighteen US and seven imports).

A sufficient amount of data (thirteen or more vehicles) were available for nine specific models which were analyzed separately as select models. Eight of these select models' categories had automatic transmissions, and one had manual transmissions, as shown in Table I.

In the 1981 Survey, 75 percent of the vehicles were equipped with automatic transmissions, and 79 percent were equipped with air-conditioners. The vehicles used in this program had an average of 10,601 deposit miles. Table II shows the distribution of odometer mileage for vehicles used in both the 1980 and 1981 Surveys. The 1981 distribution is also shown as a bar chart in Figure 1. The weighted average engine displacement for the 1981 vehicles was 2.99 ℓ (7.4 percent smaller than in 1980); the weighted average compression ratio was 8.50 (0.1 higher than in 1980).

Participants were requested to rate specific vehicle models in a pattern which minimized data bias due to differences in testing and vehicle sampling. The United States was divided into four geographical areas, with the requested ratings for a given model divided among laboratories within each geographical area. The basic timing was adjusted to manufacturers' recommended setting prior to testing. Eighty vehicles were adjusted. Twenty-eight vehicles were more than ±2° from the manufacturer's specification when received, compared with thirty-five in the 1980 Survey. The number of vehicles and their deviation in degrees spark from the manufacturer's recommended basic spark timing is shown in Table III.

IV. REFERENCE FUELS

Three series of reference fuels were used in the 1981 Survey: primary reference (PR) fuels; average sensitivity full-boiling range unleaded (FBRU) reference fuels with sensitivities similar to those of normal commercial gasoline; and high-sensitivity full-boiling range unleaded (FBRSU) reference fuels with sensitivities higher than the FBRU fuels.

A. PR Fuels

Isooctane and normal heptane, meeting ASTM specifications, were blended in two octane number increments from 76 to 82 RON, and in one octane number increments from 82 to 100 RON.

B. FBRU Reference Fuels

FBRU fuels were prepared from three base blends (RMFD-332-81, RMFD-333-81, and RMFD-334-81) in two octane number increments from 78 to 84 RON, and in one octane number increments from 84 to 100 RON.

The base blends were prepared from normal refinery streams. Inspection data furnished by the supplier are compared with those of the 1980 FBRU fuels in Appendix C, Table C-I. The physical inspections of the 1981 fuels were similar to those of the 1980 fuels, although the 70 percent and 90 percent distillation temperatures of the 1981 intermediate fuels were significantly lower than those for the equivalent 1980 blends.

The composition and average laboratory octane data for the 1981 reference fuels are presented in Appendix C, Table C-II, with the sensitivities compared with the 1980 fuels in Table C-III. The sensitivities of the 1981 fuels were similar to those of the 1980 fuels through 90 Research octane number, and had higher sensitivities than the 1980 fuels above 90 Research octane number.

C. FBRSU Reference Fuels

FBRSU fuels were prepared from three base blends (RMFD-335-81, RMFD-336-81, and RMFD-337-81) in two octane number increments from 78 to 84 RON, and in one octane number increments from 84 to 101 RON.

The base blends were prepared from typical refinery streams. Inspection data furnished by the supplier are compared with those of the 1980 base blends in Appendix C, Table C-IV. There were significant differences between the 1981 and 1980 fuels in terms of API gravity, distillation temperatures, and hydrocarbon composition.

The laboratory blending octane data for the 1981 FBRSU reference fuels are presented in Table C-V, with the sensitivities compared with the 1980 fuels in Table C-III. The sensitivities of the 1981 fuels were higher than the 1980 fuels at octane levels below 89 RON, and lower at levels above 89 RON.

V. TEST TECHNIQUE

The test technique (CRC Designation E-15-81, Attachment 2 of Appendix D) specified that octane number requirements be determined at level road acceleration conditions. The order of fuel testing was tank fuel, FBRSU fuels, FBRU fuels, and PR fuels. Knocking tendency was investigated at both maximum-throttle and by a new 50th percentile acceleration technique. Part-throttle was investigated in each vehicle, however, to determine if the part-throttle requirement was higher than the maximum full-throttle requirement. In these cases, the part-throttle requirement was determined.

The new 50th percentile acceleration technique was designed to study octane requirements of vehicles using an acceleration profile representative of average customer driving patterns. The occurrence of other abnormal combustion noise, such as surface ignition and rumble, was also reported. After-run was investigated on the test vehicles tank fuel.

The octane number requirement of a vehicle is defined as the Research or Motor octane number of the highest octane test fuel producing borderline knock which is induced by spark or surface ignition. The maximum octane number requirement of the vehicle is defined as the highest of these requirements, whether at full- or part-throttle. Maximum octane number requirements were obtained over the speed range with PR fuels only. In addition, 50th percentile acceleration technique requirements were determined with FBRU fuels.

A modification of the E-15-81 technique was provided for vehicles equipped with knock sensors, and is appended to Attachment 2 of Appendix D.

VI. DISCUSSION OF RESULTS

A. General

Of the sixteen participating laboratories, four used level roads, and twelve used chassis dynamometers. Seventy percent of the cars were tested on chassis dynamometers.

Average test temperature was 75°F, with a barometric pressure average of 29.65 in. Hg and average humidity of 76 grains per pound. Test conditions for individual observations are reported in Appendix E.

B. Distribution of Maximum Octane Number Requirements

The octane number requirement data were used to prepare satisfaction curves and tables for the following samples of 1981 model vehicles: (1) US and Imported Vehicles; (2) US and Imported Cars; (3) US Vehicles; (4) US Cars; and (5) Imported Vehicles. Research and Motor octane number requirements for the five categories at 50 percent and 90 percent satisfaction are shown in Table IV along with the corresponding 95 percent confidence limits of these requirements. In preparing the curves and tables, the octane number requirement data were weighted in accordance with final 1981 US model-year production data, and with US sales figures in the case of imports. Each curve and table should, therefore, provide an estimate of the distribution of octane number requirements of the appropriate vehicle population on the road. The procedure for assigning weighting factors and for calculating the octane number requirement distributions is described in Appendix F.

1. US and Imported Vehicles

In the 1981 Survey, maximum octane number requirements were determined on 417 vehicles with FBRU and FBRSU fuels, and on 416 vehicles in the case of PR fuels.

Maximum Research octane number requirements for all three reference fuels are shown in Figures 2a (rectangular coordinates) and 2b (probability plot). Maximum Research, Motor, and (R+M)/2 octane number requirements are listed in Table V. The 50 percent and 90 percent satisfaction level requirements are as follows:

MAXIMUM OCTANE NUMBER REQUIREMENTS

(US and Imported Vehicles)

Fuel	50% Satisfied RON	50% Satisfied MON	50% Satisfied (R+M)/2	90% Satisfied RON	90% Satisfied MON	90% Satisfied (R+M)/2
PR	89.3	89.3	89.3	93.8	93.8	93.8
FBRU	90.3	82.9	86.6	96.1	86.1	91.1
FBRSU	91.4	81.7	86.5	97.6	85.9	91.7

Comparisons of 1981 and 1980 Survey maximum Research, Motor, and (R+M)/2 octane number requirements are shown in Tables VI, VII, and VIII, respectively, for all three fuel series. Distributions of maximum RON requirements are shown in Figure 3 for PR fuels, Figure 4 for FBRU fuels, and Figure 5 for FBRSU fuels. The differences at the 50 percent and 90 percent satisfaction levels are summarized in the following table:

DIFFERENCES BETWEEN 1981 AND 1980 MAXIMUM

OCTANE NUMBER REQUIREMENTS

(US and Imported Vehicles)

Fuel	50% Satisfied RON	50% Satisfied MON	50% Satisfied (R+M)/2	90% Satisfied RON	90% Satisfied MON	90% Satisfied (R+M)/2
PR	-0.1	-0.1	-0.1	1.0	1.0	1.0
FBRU	-0.5	-0.6	-0.6	1.0	-0.1	0.5
FBRSU	-1.3	-0.5	-0.9	-0.1	0.7	0.3

Confidence limits for maximum octane number requirement distributions are given in Appendix G, Table G-I. The 95 percent confidence limits for Research octane number requirements varied from ±0.33 to ±0.48 at the 50 percent satisfaction level, and from ±0.45 to ±0.64 at the 90 percent satisfaction level.

2. US and Imported Cars

Maximum octane number requirements were determined on 392 US and imported cars with FBRU and FBRSU fuels, and on 391 cars in the case of PR fuels.

Maximum Research, Motor, and (R+M)/2 octane number requirements on all three fuel series are given in Table IX. Maximum octane number requirements at the 50 percent and 90 percent satisfaction levels are summarized in the following table:

MAXIMUM OCTANE NUMBER REQUIREMENTS

(US and Imported Cars)

	50% Satisfied			90% Satisfied		
Fuel	RON	MON	(R+M)/2	RON	MON	(R+M)/2
PR	88.9	88.9	88.9	93.4	93.4	93.4
FBRU	89.8	82.6	86.2	95.4	85.7	90.5
FBRSU	90.9	81.3	86.1	97.2	85.6	91.4

The maximum Research octane number requirements for 1981 US and imported cars are compared with 1980 model-year data in Table X for PR, FBRU, and FBRSU fuels. Corresponding comparisons of Motor and (R+M)/2 octane number requirements are given in Tables XI and XII, respectively. Differences between 1981 and 1980 data at the 50 percent and 90 percent satisfaction levels are as follows:

DIFFERENCES BETWEEN 1981 AND 1980 MAXIMUM

OCTANE NUMBER REQUIREMENTS

(US and Imported Cars)

	50% Satisfied			90% Satisfied		
Fuel	RON	MON	(R+M)/2	RON	MON	(R+M)/2
PR	-0.3	-0.3	-0.3	0.7	0.7	0.7
FBRU	-0.8	-0.8	-0.8	0.3	-0.5	-0.1
FBRSU	-1.5	-0.7	-1.1	-0.3	0.6	0.1

Confidence limits for maximum octane number requirement distributions of 1981 US and imported cars are given in Appendix G, Table G-I. The 95 percent confidence limits for Research octane number requirements varied from ±0.35 to ±0.50 at the 50 percent satisfaction level, and from ±0.47 to ±0.67 at the 90 percent satisfaction level.

3. US Vehicles

Maximum octane number requirements were determined on 318 US vehicles with FBRU and FBRSU fuels, and on 317 vehicles with PR fuels.

Distributions of maximum Research octane number requirements are plotted in Figures 6a and 6b for the three fuel series. Research, Motor, and (R+M)/2 octane number requirements for the US vehicles are given in Table XIII. Octane number requirements at the 50 percent and 90 percent satisfaction levels are listed below:

MAXIMUM OCTANE NUMBER REQUIREMENTS
(US Vehicles)

	50% Satisfied			90% Satisfied		
Fuel	RON	MON	(R+M)/2	RON	MON	(R+M)/2
PR	89.4	89.4	89.4	93.3	93.3	93.3
FBRU	91.1	83.3	87.2	96.5	86.4	91.4
FBRSU	92.2	82.2	87.2	98.1	86.3	92.2

Comparisons of maximum octane number requirements of 1981 and 1980 US vehicles for the three fuel series are given in Tables XIV, XV, and XVI in terms of RON, MON, and (R+M)/2, respectively. Distributions of maximum Research octane number requirements are shown in Figure 7 for PR fuels, in Figure 8 for FBRU fuels, and in Figure 9 for FBRSU fuels. Differences between octane number requirements of 1981 and 1980 US vehicles at the 50 percent and 90 percent satisfaction levels are given in the following table:

DIFFERENCES BETWEEN 1981 AND 1980 MAXIMUM
OCTANE NUMBER REQUIREMENTS
(US Vehicles)

	50% Satisfied			90% Satisfied		
Fuel	RON	MON	(R+M)/2	RON	MON	(R+M)/2
PR	-0.4	-0.4	-0.4	0.3	0.3	0.3
FBRU	-0.3	-0.5	-0.4	1.0	0.0	0.5
FBRSU	-1.2	-0.4	-0.8	0.0	0.8	0.4

Confidence limits for maximum octane number requirement distributions of 1981 US vehicles are tabulated in Appendix G, Table G-I. The 95 percent confidence limits for Research octane number requirements were from ±0.33 to ±0.51 at the 50 percent satisfaction level, and from ±0.45 to ±0.68 at the 90 percent satisfaction level.

4. US Cars

Maximum octane number requirements were determined on 300 US cars with FBRU and FBRSU fuels, and on 299 cars with PR fuels.

Maximum Research, Motor, and (R+M)/2 octane number requirements for all three fuel series are given in Table XVII, and summarized below for the 50 percent and 90 percent satisfaction levels:

MAXIMUM OCTANE NUMBER REQUIREMENTS
(US Cars)

	50% Satisfied			90% Satisfied		
Fuel	RON	MON	(R+M)/2	RON	MON	(R+M)/2
PR	89.0	89.0	89.0	92.9	92.9	92.9
FBRU	90.6	83.0	86.8	95.8	85.9	90.8
FBRSU	91.8	82.0	86.9	97.8	86.0	91.9

The maximum Research, Motor, and (R+M)/2 octane number requirements of US cars tested in the 1981 and 1980 Surveys are compared in Tables XVIII, XIX, and XX, respectively, for all three fuel series. The differences at the 50 percent and 90 percent satisfaction levels are as follows:

DIFFERENCES BETWEEN 1981 AND 1980 MAXIMUM
OCTANE NUMBER REQUIREMENTS
(US Cars)

	50% Satisfied			90% Satisfied		
Fuel	RON	MON	(R+M)/2	RON	MON	(R+M)/2
PR	-0.6	-0.6	-0.6	-0.1	-0.1	-0.1
FBRU	-0.7	-0.8	-0.7	0.3	-0.5	-0.1
FBRSU	-1.3	-0.5	-0.9	-0.1	0.6	0.3

Confidence limits for maximum octane number requirement distributions of 1981 US cars are given in Appendix G, Table G-I. The 95 percent confidence limits for Research octane number requirements varied between ±0.36 and ±0.53 at the 50 percent satisfaction level, and between ±0.49 and ±0.71 at the 90 percent satisfaction level.

5. Imported Vehicles

Maximum octane number requirements were determined on ninety-nine imported vehicles with PR, FBRU, and FBRSU fuels. Maximum Research octane number requirements for all three reference fuel series are plotted in Figures 10a and 10b. Maximum octane number requirements in terms of RON, MON, and (R+M)/2 are given in Table XXI. The 50 percent and 90 percent satisfaction level maximum octane number requirements are listed in the following table:

MAXIMUM OCTANE NUMBER REQUIREMENTS

(Imported Vehicles)

	50% Satisfied			90% Satisfied		
Fuel	RON	MON	(R+M)/2	RON	MON	(R+M)/2
PR	89.0	89.0	89.0	95.0	95.0	95.0
FBRU	89.0	82.1	85.6	95.1	85.5	90.3
FBRSU	90.1	80.8	85.5	96.2	85.0	90.6

The maximum Research, Motor, and (R+M)/2 octane number requirements of imported vehicles in the 1981 and 1980 Surveys are compared in Tables XXII, XXIII, and XXIV, respectively, for all three fuel series. The differences at the 50 percent and 90 percent satisfaction levels are as follows:

DIFFERENCES BETWEEN 1981 AND 1980 MAXIMUM

OCTANE NUMBER REQUIREMENTS

(Imported Vehicles)

	50% Satisfied			90% Satisfied		
Fuel	RON	MON	(R+M)/2	RON	MON	(R+M)/2
PR	1.0	1.0	1.0	3.5	3.5	3.5
FBRU	0.0	-0.2	-0.1	2.5	0.9	1.7
FBRSU	-0.7	-0.3	-0.5	1.2	1.5	1.4

Confidence limits for maximum octane number requirement distributions of 1981 imported vehicles are tabulated in Appendix G, Table G-I. The 95 percent confidence limits for Research octane number requirements were from ±0.89 to ±0.92 at the 50 percent satisfaction level, and from ±1.20 to ±1.24 at the 90 percent satisfaction level.

6. Maximum Requirements at Part-Throttle

The throttle positions for maximum octane number requirements of tested vehicles were reported as full-throttle or part-throttle. Part-throttle requirements were defined only when their requirements were higher than the maximum full-throttle requirements. The number and percentage of vehicles having FBRU part-throttle octane number requirements greater than full-throttle requirements are shown below, along with a comparison with the 1980 Survey. The percentages of all vehicles having maximum requirements at part-throttle were 9.8 percent in 1981, compared with 6.7 percent in 1980.

VEHICLES HAVING FBRU PART-THROTTLE REQUIREMENTS

> FULL-THROTTLE REQUIREMENTS

(1981 and 1980 US and Imported Vehicles)

	No. Vehicles Tested	No. of Vehicles	% of Vehicles
1981 US and Imported Vehicles	417	41	9.8
1980 US and Imported Vehicles	389	26	6.7

7. Knock Sensor-Equipped Vehicles

Six vehicles equipped with knock sensors (knock limiters) were tested using the modified E-15-81 and 50th percentile acceleration techniques. The tabulated results of the individual vehicles tested are given in Appendix H. Due to the small sample of vehicles, no analysis was performed. There were also variations in the procedure and equipment used by the contributing laboratories. Maximum and minimum octane number requirements are based on spark-retard meter readings rather than audible knock, and therefore, cannot be analyzed with data obtained under the E-15-81 technique.

C. 50th Percentile Acceleration Technique Octane Number Requirement Distributions on FBRU Fuels

Fiftieth percentile acceleration technique octane number requirements were determined on FBRU fuels using the 50th percentile acceleration procedure as described in the CRC E-15-81 Technique (Appendix D, Attachment 2). Weighted population distributions were developed from these data for the five vehicle categories: (1) US and Imported Vehicles (414 vehicles); (2) US and Imported Cars (389 cars); (3) US Vehicles (316 vehicles); (4) US Cars (298 cars); and (5) Imported Vehicles (98 vehicles). Fiftieth percentile acceleration technique Research, Motor, and (R+M)/2 octane number requirements for each respective category are summarized in Tables XXV, XXVI, XXVII, XXVIII, and XXIX. Distribution of 50th percentile acceleration technique Research octane number requirements are presented in Figures 11a and 11b for US and imported vehicles, Figures 12a and 12b for US vehicles, and Figures 13a and 13b for imported vehicles.

Maximum FBRU Research octane number requirements are compared with 50th percentile acceleration technique requirements for US and imported vehicles in Table XXX and Figure 14. The difference between maximum and 50th percentile acceleration technique Research octane number requirements is approximately two octane numbers across the satisfaction range. There were 153 vehicles which had their highest requirement in Mode 1, 117 in Mode 2, and 139 had equal requirements in both modes (Modes 1 and 2 are described in Appendix D). Five vehicles had requirements less than the lowest octane fuel available. The average vehicle speed at which knock occurred was 43 mph.

The distribution of vehicles within ten mile-per-hour increments are shown in the following table:

DISTRIBUTION OF VEHICLES

MPH Increment:	0-9	10-19	20-29	30-39	40-49	50-59	60
No. of Vehicles:	2	0	23	114	146	121	3

Average manifold vacuum for knock was 2.0 in. Hg for the 50th percentile acceleration technique requirements, compared with 1.5 in. Hg for maximum requirements. Sixty-nine vehicles had 50th percentile acceleration technique requirements equal to maximum requirements, and sixteen vehicles had requirements greater than maximum requirements. Comparisons of vehicles with 50th percentile acceleration technique requirements higher than maximum requirements are shown in Table XXXI.

Confidence limits for 50th percentile acceleration technique Research and Motor octane number requirement distributions for all five categories of 1981 vehicles are shown in Appendix G, Table G-II. The 95 percent confidence limits at the 50 percent and 90 percent satisfaction levels ranged from ±0.43 to ±0.64 for RON and ±0.24 to ±0.35 for MON for all cases except imported vehicles, which had much wider confidence limits.

D. Select Models

There was a total of nine select models, consisting of a total of seven engine-chassis combinations. All of these were select models from the program. One model, although originally intended in the program as a select model, did not have a sufficient number of cars representing it to analyze it as a select model. There were enough cars tested of another model to divide them into two separate select model groups differentiating between automatic transmissions and manual transmissions. There were enough Model HIA 238 cars (fourteen) tested to separate them into an additional select model group, although Model HIA 238 is the same engine-chassis combination as Models IIA 238/LIA 238. The identification and specifications of the engine-chassis combinations are given in Table I.

Maximum Research, Motor, and (R+M)/2 octane number requirements are shown for 50 percent and 90 percent satisfaction levels on PR, FBRU, and FBRSU fuels in Table XXXII. Maximum octane number requirements for each select model at various satisfaction levels are listed in Appendix I, Table I-I. Maximum Research, Motor, and (R+M)/2 octane number requirements for the individual cars of each select model are given in Table I-II.

Octane requirement data for the 50th percentile acceleration technique are shown in Table I-III of Appendix I for various satisfaction levels, and Table I-IV for the individual cars of each select model.

Maximum Research octane number satisfaction curves for the nine select models are shown in Figures 15 through 23 for all three fuel series, in addition to the 50th percentile acceleration technique satisfaction curves on FBRU fuels. The individual data points plotted on the figures represent the maximum requirements obtained on FBRU reference fuels. Each curve was constructed by use of the "$\bar{Z}$" method, which is discussed in Appendix F. The 95 percent confidence limits for maximum requirements are shown in Appendix G, Table G-III, and for 50th percentile acceleration technique requirements in Table G-IV.

E. Tank Fuel

As required by the program, tank fuel was tested for incidence of knock whenever an owners' questionnaire was obtained; however, owners' questionnaires were obtained only when the vehicle tested had a regular driver and the ignition timing did not have to be reset. To gain additional information, tank fuel ratings were made by many participants on many other vehicles which did not meet the restrictions listed.

1. Owner/Rater Comparison of Tank Fuel Knock

Owners' questionnaires were completed for 149 vehicles which had spark timing set to manufacturers' specifications. This is about 25 percent fewer than reported in the 1980 Survey. Of the 149 1981 vehicles, 43.6 percent were reported by trained raters to be knocking on tank fuel, whereas the owners reported 29.5 percent. This results in an owner/rater knock ratio of 0.68. The 43.6 percent of vehicles found to be knocking by trained raters in 1981 is lower than in past surveys. The owner/rater comparison of tank fuel knock data for 1981, along with previous survey data back to 1974, is presented in Table XXXIII.

2. Objectionable Versus Unobjectionable Knock

Of the owners reporting knock with vehicles which had their spark timing set to manufacturers' specifications, 40.9 percent found knock to be objectionable. This percentage of objectionable knock is lower than the 48.5 percent found in 1980, as shown on Table XXXIII.

3. Tank Fuel Knock Reported by Trained Raters

Tank fuel knock observations were reported by trained raters on 326 of the 417 test vehicles. The percentages of all 1981 vehicles and the select models knocking on tank fuel are shown in Table XXXIV. On a weighted basis, 42.9 percent of the 1981 vehicles tested knocked on tank fuel, compared with 49.9 percent in the 1980 Survey and 47.3 percent of the vehicles in the 1979 Survey. As shown in the table, however, five of the nine select models tested had high knocking percentages ranging from 56 percent to 78 percent.

4. After-Run on Tank Fuel

After-run was reported by trained raters on nine of 309 vehicles tested on tank fuel in 1981. Of the 148 owners' questionnaires completed, there were nineteen reports of after-run on tank fuel. Eighteen of these vehicles had the spark advance set according to the manufacturers' recommendations. One vehicle when received was retarded three degrees from the recommended setting. Table XXXV shows maximum FBRU octane requirements, along with RON and MON determinations of the tank fuel. These are for the vehicles with after-run reported by the owners (spark advance at the manufacturers' recommendations).

F. Surface Ignition and Rumble

There were no reports of either surface ignition knock or rumble in the 1981 Survey.

G. Engine Speed for Maximum and 50th Percentile Acceleration Technique Octane Number Requirements

Engine speeds at which maximum octane number requirements occurred for each select model are shown in Table XXXVI for PR, FBRU, and FBRSU fuels. Weighted data for all 1981 vehicles are shown in Table XXXVII and Figure 24 for both maximum and 50th percentile acceleration technique octane number requirements. Requirements for the 50th percentile acceleration technique were generally found at higher rpm's than maximum-throttle requirements.

Engine speeds for 50th percentile acceleration technique octane number requirements are shown in Table XXXVIII for select models. Table XXXIX shows vehicle speeds in miles-per-hour for octane number requirements determined during the 50th percentile acceleration technique.

H. Road Octane Number Depreciation of FBRU and FBRSU Fuels

Road octane number ratings and road octane number depreciation for FBRU and FBRSU fuels were determined from the octane requirement data for all vehicles. The results are shown in Table XL.

In this report, the road octane number rating of FBRU and FBRSU fuels is defined as the primary reference fuel octane level which satisfied the same percentage of vehicles. Depreciation values were established by subtracting the road octane number rating of the fuel from its Research octane number. Depreciation values of FBRU fuels in the range 88 to 98 RON varied from 0.6 to 2.7, compared with 1.8 to 2.7 in the 1980 Survey. Depreciation of FBRSU fuels in the range 88 to 99 RON varied from 1.6 to 3.3, compared with 3.0 to 4.9 in last year's Survey.

I. Speed Range Octane Number Requirements

Primary reference fuel octane number requirements were determined over a range of engine speeds from 1,000 to 3,750 rpm on 303 vehicles. The individual car data are given in Appendix J, Table J-I. Speed range data were analyzed for the nine select models totaling 123 cars, and are plotted in Figures J-1 through J-9 for the 50 percent satisfaction level. The select model calculated results are given in Table J-II.

J. Gear Position for Maximum Requirements

The throttle/gear position for maximum octane number requirements on FBRU fuels is shown in Appendix K. Of the 417 vehicles tested, 311 (75 percent) were equipped with automatic transmissions and 106 (25 percent) were equipped with manual transmissions.

Eighty-nine percent of the automatic-transmission cars had maximum requirements at full-throttle (69 percent in the highest gear and 20 percent in passing gear), and 10 percent had maximum requirements at part-throttle in the highest gear. Ninety percent of the manual transmission cars had maximum requirements at full-throttle (1 percent in 2nd, 12 percent in 3rd, and 77 percent in 4th gear), and 9 percent had maximum requirements at part-throttle in the highest gear. (The critical gear could not be determined for the other 1 percent of each transmission group due to maximum requirements less than 78 RON.

TABLES

AND

FIGURES

TABLE I

1981 SELECT MODEL SPECIFICATIONS

Model	Disp. ℓ	Engine Type	Brake HP	Carb. Bbl.	Comp. Ratio	Trans-mission
Chrysler Corporation:						
Dodge Omni/Plymouth Horizon	1.7	L-4	63	2	8.2	A
Dodge Aries/Plymouth Reliant	2.2	L-4	81	2	8.5	A
Ford Motor Company:						
Escort/Lynx	1.6	L-4	65	2	8.8	A
Escort/Lynx	1.6	L-4	65	2	8.8	M
Fairmont/Zephyr	2.3	L-4	88	2	9.0	A
General Motors Corporation:						
GM "X" Body	2.5	L-4	84	2	8.2	A
GM "X" Body	2.8	V-6	110	2	8.5	A
Buick Regal/Century/ Oldsmobile Cutlass	3.8	V-6	110	2	8.0	A
Pontiac LeMans/Grand Prix	3.8	V-6	110	2	8.0	A

TABLE II

DISTRIBUTION OF ODOMETER MILEAGE

FOR TESTED VEHICLES

Mileage	No. of Vehicles Within Mileage Increments	
	1981 Vehicles	1980 Vehicles
0 - 1,999	0	0
2,000 - 3,999	0	0
4,000 - 5,999	29	44
6,000 - 7,999	104	86
8,000 - 9,999	95	67
10,000 - 11,999	59	68
12,000 - 13,999	59	56
14,000 - 15,999	29	36
16,000 - 17,999	18	33
18,000 - 19,999	9	21
20,000 - 24,999	9	11
25,000 - 25,999	3	5
30,000 +	3	2
No. of Vehicles	417	429
Average Mileage	10,601	11,253

TABLE III

1981 BASIC TIMING ADJUSTMENTS

Degrees	No. of Vehicles +	No. of Vehicles -
1	7	6
2	25	14
3	12	5
4	3	5
5	0	2
6	0	0
7	0	0
8	0	0
9	0	0
10	0	0
11	0	1
	47	33

Total 80

TABLE IV

OCTANE NUMBER REQUIREMENTS WITH 95% CONFIDENCE LIMITS

Weighted Population	Fuel	No. Vehicles	Research Octane No. 50% Sat.	Research Octane No. 90% Sat.	Motor Octane No. 50% Sat.	Motor Octane No. 90% Sat.
A. Maximum Octane Number Requirements						
US and Imported Vehicles	PR	416	89.3 ± 0.33	93.8 ± 0.45	89.3 ± 0.33	93.8 ± 0.45
	FBRU	417	90.3 ± 0.42	96.1 ± 0.57	82.9 ± 0.24	86.1 ± 0.32
	FBRSU	417	91.4 ± 0.48	97.6 ± 0.64	81.7 ± 0.32	85.9 ± 0.44
US and Imported Cars	PR	391	88.9 ± 0.35	93.4 ± 0.47	88.9 ± 0.35	93.4 ± 0.47
	FBRU	392	89.8 ± 0.44	95.4 ± 0.59	82.6 ± 0.24	85.7 ± 0.33
	FBRSU	392	90.9 ± 0.50	97.2 ± 0.67	81.3 ± 0.34	85.6 ± 0.45
US Vehicles	PR	317	89.4 ± 0.33	93.3 ± 0.45	89.4 ± 0.33	93.3 ± 0.45
	FBRU	318	91.1 ± 0.43	96.5 ± 0.58	83.3 ± 0.25	86.4 ± 0.34
	FBRSU	318	92.2 ± 0.51	98.1 ± 0.68	82.2 ± 0.34	86.3 ± 0.47
US Cars	PR	299	89.0 ± 0.36	92.9 ± 0.49	89.0 ± 0.36	92.9 ± 0.49
	FBRU	300	90.6 ± 0.45	95.8 ± 0.61	83.0 ± 0.26	85.9 ± 0.35
	FBRSU	300	91.8 ± 0.53	97.8 ± 0.71	82.0 ± 0.36	86.0 ± 0.48
Imported Vehicles	PR	99	89.0 ± 0.89	95.0 ± 1.20	89.0 ± 0.89	95.0 ± 1.20
	FBRU	99	89.0 ± 0.90	95.1 ± 1.21	82.1 ± 0.50	85.5 ± 0.68
	FBRSU	99	90.1 ± 0.92	96.3 ± 1.24	80.8 ± 0.61	85.0 ± 0.82
B. 50th Percentile Acceleration Technique Octane Number Requirements						
US and Imported Vehicles	FBRU	414	88.1 ± 0.46	94.3 ± 0.62	81.7 ± 0.25	85.1 ± 0.33
US and Imported Cars	FBRU	389	87.7 ± 0.48	93.7 ± 0.64	81.4 ± 0.26	84.7 ± 0.35
US Vehicles	FBRU	316	89.3 ± 0.43	94.5 ± 0.58	82.3 ± 0.24	85.2 ± 0.32
US Cars	FBRU	298	88.7 ± 0.47	94.1 ± 0.63	82.0 ± 0.26	84.9 ± 0.35
Imported Vehicles	FBRU	98	86.9 ± 1.04	93.5 ± 1.40	81.0 ± 0.56	84.6 ± 0.76

TABLE V

MAXIMUM RESEARCH, MOTOR, AND (R+M)/2 OCTANE NUMBER REQUIREMENTS

1981 US and Imported Vehicles

Percent Satisfied	PR Fuels	FBRU Fuels			FBRSU Fuels		
		RON	MON	(R+M)/2	RON	MON	(R+M)/2
10	84.7	85.5	80.1	82.8	86.3	78.2	82.3
20	86.2	87.0	81.0	84.0	88.0	79.4	83.7
30	87.5	88.0	81.6	84.8	89.2	80.3	84.7
40	88.4	89.1	82.1	85.6	90.2	81.0	85.6
50	89.3	90.3	82.9	86.6	91.4	81.7	86.5
60	90.1	91.6	83.5	87.6	92.7	82.6	87.7
70	91.1	92.8	84.2	88.5	94.0	83.4	88.7
80	92.2	94.0	84.9	89.5	95.6	84.6	90.1
90	93.8	96.1	86.1	91.1	97.6	85.9	91.7
95	95.6	97.9	87.3	92.6	99.7	87.4	93.5
98	97.0	H	H	H	H	H	H
99	98.0	H	H	H	H	H	H

TABLE VI

COMPARISON OF MAXIMUM RESEARCH OCTANE NUMBER REQUIREMENTS

1981 and 1980 US and Imported Vehicles

Percent Satisfied	PR Fuels			FBRU Fuels			FBRSU Fuels		
	1981	1980	Δ	1981	1980	Δ	1981	1980	Δ
10	84.7	84.3	0.4	85.5	85.6	-0.1	86.3	86.8	-0.5
20	86.2	86.3	-0.1	87.0	88.0	-1.0	88.0	89.6	-1.6
30	87.5	87.6	-0.1	88.0	89.1	-1.1	89.2	90.7	-1.5
40	88.4	88.6	-0.2	89.1	90.0	-0.9	90.2	91.7	-1.5
50	89.3	89.4	-0.1	90.3	90.8	-0.5	91.4	92.7	-1.3
60	90.1	90.1	0.0	91.6	91.7	-0.1	92.7	93.7	-1.0
70	91.1	90.8	0.3	92.8	92.6	0.2	94.0	94.8	-0.8
80	92.2	91.6	0.6	94.0	93.7	0.3	95.6	96.1	-0.5
90	93.8	92.8	1.0	96.1	95.1	1.0	97.6	97.7	-0.1
95	95.6	93.9	1.7	97.9	96.1	1.8	99.7	98.9	0.7
98	97.0	95.0	2.0	H	97.5	-	H	100.0	-
99	98.0	95.5	2.5	H	98.8	-	H	H	-

TABLE VII

COMPARISON OF MAXIMUM MOTOR OCTANE NUMBER REQUIREMENTS

1981 and 1980 US and Imported Vehicles

Percent Satisfied	PR Fuels 1981	PR Fuels 1980	PR Fuels Δ	FBRU Fuels 1981	FBRU Fuels 1980	FBRU Fuels Δ	FBRSU Fuels 1981	FBRSU Fuels 1980	FBRSU Fuels Δ
10	84.7	84.3	0.4	80.1	80.1	0.0	78.2	78.9	-0.7
20	86.2	86.3	-0.1	81.0	81.7	-0.7	79.4	80.4	-1.0
30	87.5	87.6	-0.1	81.6	82.4	-0.8	80.3	81.0	-0.7
40	88.4	88.6	-0.2	82.1	83.0	-0.9	81.0	81.6	-0.6
50	89.3	89.4	-0.1	82.9	83.5	-0.6	81.7	82.2	-0.5
60	90.1	90.1	0.0	83.5	84.0	-0.5	82.6	82.8	-0.2
70	91.1	90.8	0.3	84.2	84.6	-0.4	83.4	83.4	0.0
80	92.2	91.6	0.6	84.9	85.3	-0.4	84.6	84.2	0.4
90	93.8	92.8	1.0	86.1	86.2	-0.1	85.9	85.2	0.7
95	95.6	93.9	1.7	87.3	86.8	0.5	87.4	86.2	1.2
98	97.0	95.0	2.0	H	87.7	-	H	87.3	-
99	98.0	95.5	2.5	H	88.6	-	H	H	-

TABLE VIII

COMPARISON OF MAXIMUM (R+M)/2 OCTANE NUMBER REQUIREMENTS

1981 and 1980 US and Imported Vehicles

Percent Satisfied	PR Fuels			FBRU Fuels			FBRSU Fuels		
	1981	1980	Δ	1981	1980	Δ	1981	1980	Δ
10	84.7	84.3	0.4	82.8	82.9	-0.1	82.3	82.8	-0.5
20	86.2	86.3	-0.1	84.0	84.8	-0.8	83.7	85.0	-1.3
30	87.5	87.6	-0.1	84.8	85.7	-0.9	84.7	85.9	-1.2
40	88.4	88.6	-0.1	85.6	86.5	-0.9	85.6	86.7	-1.1
50	89.3	89.4	-0.1	86.6	87.2	-0.6	86.6	87.5	-0.9
60	90.1	90.1	0.0	87.6	87.8	-0.2	87.7	88.3	-0.6
70	91.1	90.8	0.3	88.5	88.6	-0.1	88.7	89.1	-0.4
80	92.2	91.6	0.6	89.5	89.5	0.0	90.1	90.1	0.0
90	93.8	92.8	1.0	91.1	90.6	0.5	91.7	91.4	0.3
95	95.6	93.9	1.7	92.6	91.5	1.1	93.5	92.5	1.0
98	97.0	95.0	2.0	H	92.6	-	H	93.6	-
99	98.0	95.5	2.5	H	93.7	-	H	H	-

TABLE IX

MAXIMUM RESEARCH, MOTOR, AND (R+M)/2 OCTANE NUMBER REQUIREMENTS

1981 US and Imported Cars

Percent Satisfied	PR Fuels	FBRU Fuels RON	FBRU Fuels MON	FBRU Fuels (R+M)/2	FBRSU Fuels RON	FBRSU Fuels MON	FBRSU Fuels (R+M)/2
10	84.4	85.3	80.0	82.6	86.1	78.1	82.1
20	85.9	86.7	80.8	83.8	87.7	79.2	83.5
30	87.1	87.7	81.4	84.6	88.9	80.0	84.5
40	88.1	88.7	81.9	85.3	89.9	80.7	85.3
50	88.9	89.8	82.6	86.2	90.9	81.3	86.1
60	89.2	91.2	83.3	87.2	92.2	82.3	87.3
70	90.7	92.5	84.0	88.3	93.7	83.2	88.5
80	91.9	93.7	84.7	89.2	95.2	84.3	89.8
90	93.4	95.4	85.7	90.5	97.2	85.6	91.4
95	94.9	97.4	87.0	92.2	99.4	87.2	93.2
98	96.5	H	H	H	H	H	H
99	97.6	H	H	H	H	H	H

TABLE X

COMPARISON OF MAXIMUM RESEARCH OCTANE NUMBER REQUIREMENTS

1981 and 1980 US and Imported Cars

Percent Satisfied	PR Fuels			FBRU Fuels			FBRSU Fuels		
	1981	1980	Δ	1981	1980	Δ	1981	1980	Δ
10	84.4	83.8	0.6	85.3	85.2	0.1	86.1	86.3	-0.2
20	85.9	86.2	-0.3	86.7	87.8	-1.1	87.7	89.4	-1.7
30	87.1	87.5	-0.4	87.7	89.0	-1.3	88.9	90.5	-1.6
40	88.1	88.4	-0.3	88.7	89.8	-1.1	89.9	91.4	-1.5
50	88.9	89.2	-0.3	89.8	90.6	-0.8	90.9	92.4	-1.5
60	89.7	90.0	-0.3	91.2	91.4	-0.2	92.2	93.3	-1.1
70	90.7	90.6	0.1	92.5	92.4	0.1	93.7	94.5	-0.8
80	91.9	91.4	0.5	93.7	93.6	0.1	95.2	96.0	-0.8
90	93.4	92.7	0.7	95.4	95.1	0.3	97.2	97.5	-0.3
95	94.9	94.1	0.8	97.4	96.2	1.2	99.4	98.8	0.6
98	96.5	95.1	1.4	H	97.8	-	H	100.3	-
99	97.6	95.6	2.0	H	99.1	-	H	H	-

TABLE XI

COMPARISON OF MAXIMUM MOTOR OCTANE NUMBER REQUIREMENTS

1981 and 1980 US and Imported Cars

Percent Satisfied	PR Fuels			FBRU Fuels			FBRSU Fuels		
	1981	1980	Δ	1981	1980	Δ	1981	1980	Δ
10	84.4	83.8	0.6	80.0	79.8	0.2	78.1	78.6	-0.5
20	85.9	86.2	-0.3	80.8	81.6	-0.8	79.2	80.3	-1.1
30	87.1	87.5	-0.4	81.4	82.3	-0.9	80.1	80.9	-0.8
40	88.1	88.4	-0.3	81.9	82.9	-1.0	80.7	81.5	-0.8
50	88.9	89.2	-0.3	82.6	83.4	-0.8	81.3	82.0	-0.7
60	89.7	90.0	-0.3	83.3	83.9	-0.6	82.3	82.6	-0.3
70	90.7	90.6	0.1	84.0	84.4	-0.4	83.2	83.2	0.0
80	91.9	91.4	0.5	84.7	85.2	-0.5	84.3	84.1	0.2
90	93.4	92.7	0.7	85.7	86.2	-0.5	85.6	85.0	0.6
95	94.9	94.1	0.8	87.0	86.8	0.2	87.2	86.2	1.0
98	96.5	95.1	1.4	H	87.9	-	H	87.5	-
99	97.6	95.6	2.0	H	88.9	-	H	H	-

TABLE XII

COMPARISON OF MAXIMUM (R+M)/2 OCTANE NUMBER REQUIREMENTS

1981 and 1980 US and Imported Cars

Percent Satisfied	PR Fuels			FBRU Fuels			FBRSU Fuels		
	1981	1980	Δ	1981	1980	Δ	1981	1980	Δ
10	84.4	83.8	0.6	82.6	82.5	0.1	82.1	82.4	-0.3
20	85.9	86.2	-0.3	83.8	84.7	-0.9	83.5	84.8	-1.3
30	87.1	87.5	-0.4	84.6	85.6	-1.0	84.5	85.7	-1.2
40	88.1	88.4	-0.3	85.3	86.3	-1.0	85.3	86.4	-1.1
50	88.9	89.2	-0.3	86.2	87.0	-0.8	86.1	87.2	-1.1
60	89.2	90.0	-0.8	87.2	87.7	-0.5	87.3	88.0	-0.7
70	90.7	90.6	0.1	88.3	88.4	-0.1	88.5	88.8	-0.3
80	91.9	91.4	0.5	89.2	89.4	-0.2	89.8	90.0	-0.2
90	93.4	92.7	0.7	90.5	90.6	-0.1	91.4	91.3	0.1
95	94.9	94.1	0.8	92.2	91.5	0.7	93.2	92.5	0.7
98	96.5	95.1	1.4	H	92.8	-	H	93.9	-
99	97.6	95.6	2.0	H	94.0	-	H	H	-

TABLE XIII

MAXIMUM RESEARCH, MOTOR, AND (R+M)/2 OCTANE NUMBER REQUIREMENTS

1981 US Vehicles

Percent Satisfied	PR Fuels	FBRU Fuels			FBRSU Fuels		
		RON	MON	(R+M)/2	RON	MON	(R+M)/2
10	84.8	85.9	80.3	83.1	86.6	78.4	82.5
20	86.3	87.2	81.1	84.1	88.2	79.6	83.9
30	87.5	88.3	81.7	85.0	89.7	80.6	85.1
40	88.6	89.8	82.6	86.2	90.9	81.3	86.1
50	89.4	91.1	83.3	87.2	92.2	82.2	87.2
60	90.3	92.2	83.8	88.0	93.4	83.0	88.2
70	91.2	93.2	84.4	88.8	94.8	83.9	89.4
80	92.0	94.4	85.2	89.8	96.1	84.9	90.5
90	93.3	96.5	86.4	91.4	98.1	86.3	92.2
95	95.0	98.2	87.5	92.8	100.0	87.6	93.8
98	96.3	H	H	H	H	H	H
99	97.0	H	H	H	H	H	H

TABLE XIV

COMPARISON OF MAXIMUM RESEARCH OCTANE NUMBER REQUIREMENTS

1981 and 1980 US Vehicles

Percent Satisfied	PR Fuels 1981	PR Fuels 1980	PR Fuels Δ	FBRU Fuels 1981	FBRU Fuels 1980	FBRU Fuels Δ	FBRSU Fuels 1981	FBRSU Fuels 1980	FBRSU Fuels Δ
10	84.8	85.3	-0.5	85.9	86.8	-0.9	86.6	88.3	-1.7
20	86.3	87.0	-0.7	87.2	88.8	-1.6	88.2	90.3	-2.1
30	87.5	88.2	-0.7	88.3	89.8	-1.5	89.7	91.4	-1.7
40	88.6	89.1	-0.5	89.8	90.6	-0.8	90.9	92.4	-1.5
50	89.4	89.8	-0.4	91.1	91.4	-0.3	92.2	93.4	-1.2
60	90.3	90.4	-0.1	92.2	92.3	-1.1	93.4	94.5	-1.1
70	91.2	91.1	0.1	93.2	93.2	0.0	94.8	95.6	-0.8
80	92.0	91.9	0.1	94.4	94.2	0.2	96.1	96.6	-0.5
90	93.3	93.0	0.3	96.5	95.5	1.0	98.1	98.1	0.0
95	95.0	94.1	0.9	98.2	96.5	1.7	100.0	99.1	0.9
98	96.3	95.2	1.1	H	98.0	-	H	100.2	-
99	97.0	95.6	1.4	H	99.6	-	H	H	-

TABLE XV

COMPARISON OF MAXIMUM MOTOR OCTANE NUMBER REQUIREMENTS

1981 and 1980 US Vehicles

Percent Satisfied	PR Fuels			FBRU Fuels			FBRSU Fuels		
	1981	1980	Δ	1981	1980	Δ	1981	1980	Δ
10	84.8	85.3	-0.5	80.3	80.9	-0.6	78.4	79.8	-1.4
20	86.3	87.0	-0.7	81.1	82.2	-1.1	79.6	80.8	-1.2
30	87.5	88.2	-0.7	81.7	82.8	-1.1	80.6	81.4	-0.8
40	88.6	89.1	-0.5	82.6	83.4	-1.8	81.3	82.0	-0.7
50	89.4	89.8	-0.4	83.3	83.8	-0.5	82.2	82.6	-0.4
60	90.3	90.4	-0.1	83.8	84.4	-0.6	83.0	83.2	-0.2
70	91.2	91.1	0.1	84.4	85.0	-0.6	83.9	83.9	0.0
80	92.0	91.9	0.1	85.2	85.6	-0.4	84.9	84.5	0.4
90	93.3	93.0	0.3	86.4	86.4	0.0	86.3	85.5	0.8
95	95.0	94.1	0.9	87.5	87.0	0.5	87.6	86.4	1.2
98	96.3	95.2	1.1	H	88.1	-	H	87.4	-
99	97.0	95.6	1.4	H	89.3	-	H	H	-

TABLE XVI

COMPARISON OF MAXIMUM (R+M)/2 OCTANE NUMBER REQUIREMENTS

1981 and 1980 US Vehicles

Percent Satisfied	PR Fuels			FBRU Fuels			FBRSU Fuels		
	1981	1980	Δ	1981	1980	Δ	1981	1980	Δ
10	84.8	85.3	-0.5	83.1	83.9	-0.8	82.5	84.0	-1.5
20	86.3	87.0	-0.7	84.1	85.5	-1.4	83.9	85.5	-1.6
30	87.5	88.2	-0.7	85.0	86.3	-1.3	85.1	86.4	-1.3
40	88.6	89.1	-0.5	86.2	87.0	-0.8	86.1	87.2	-1.1
50	89.4	89.8	-0.4	87.2	87.6	-0.4	87.2	88.0	-0.8
60	90.3	90.4	-0.1	88.0	88.3	-0.3	88.2	88.8	-0.6
70	91.2	91.1	0.1	88.8	89.1	-0.3	89.4	89.7	-0.3
80	92.0	91.9	0.1	89.8	89.9	-0.1	90.5	90.6	-0.1
90	93.3	93.0	0.3	91.4	90.9	0.5	92.2	91.8	0.4
95	95.0	94.1	0.9	92.8	91.7	1.1	93.8	92.7	1.1
98	96.3	95.2	1.1	H	93.1	-	H	93.8	-
99	97.0	95.6	1.4	H	94.4	-	H	H	-

TABLE XVII

MAXIMUM RESEARCH, MOTOR, AND (R+M)/2 OCTANE NUMBER REQUIREMENTS

1981 US Cars

Percent Satisfied	PR Fuels	FBRU Fuels RON	FBRU Fuels MON	FBRU Fuels (R+M)/2	FBRSU Fuels RON	FBRSU Fuels MON	FBRSU Fuels (R+M)/2
10	84.6	85.7	80.2	82.9	86.4	78.3	82.3
20	86.0	86.9	81.0	84.0	87.9	79.4	83.6
30	87.2	87.9	81.5	84.7	89.3	80.3	84.8
40	88.1	89.2	82.2	85.7	90.5	81.1	85.8
50	89.0	90.6	83.0	86.8	91.8	82.0	86.9
60	89.9	92.0	83.7	87.8	93.1	82.9	88.0
70	90.8	93.1	84.3	88.7	94.5	83.7	89.1
80	91.7	94.1	85.0	89.5	95.8	84.7	90.2
90	92.9	95.8	85.9	90.8	97.8	86.0	91.9
95	94.4	97.7	87.2	92.4	99.8	87.5	93.6
98	96.0	H	H	H	H	H	H
99	96.9	H	H	H	H	H	H

TABLE XVIII

COMPARISON OF MAXIMUM RESEARCH OCTANE NUMBER REQUIREMENTS

1981 and 1980 US Cars

Percent Satisfied	PR Fuels			FBRU Fuels			FBRSU Fuels		
	1981	1980	Δ	1981	1980	Δ	1981	1980	Δ
10	84.6	85.1	-0.5	85.7	86.5	-0.8	86.4	87.8	-1.4
20	86.0	86.9	-0.9	86.9	88.8	-1.9	87.9	90.2	-2.3
30	87.2	88.1	-0.9	87.9	89.7	-1.8	89.3	91.2	-1.9
40	88.1	89.0	-0.9	89.2	90.5	-1.3	90.5	92.2	-1.7
50	89.0	89.6	-0.6	90.6	91.3	-0.7	91.8	93.1	-1.3
60	89.9	90.2	-0.3	92.0	92.1	-0.1	93.1	94.2	-1.1
70	90.8	90.8	0.0	93.1	93.1	0.0	94.5	95.3	-0.8
80	91.7	91.7	0.0	94.1	94.2	-0.1	95.8	96.5	-0.7
90	92.9	93.0	-0.1	95.8	95.5	0.3	97.8	97.9	-0.1
95	94.4	94.4	0.0	97.7	96.6	1.1	99.8	99.1	0.7
98	96.0	95.3	0.7	H	98.3	-	H	100.6	-
99	96.9	95.7	1.2	H	H	-	H	H	-

TABLE XIX

COMPARISON OF MAXIMUM MOTOR OCTANE NUMBER REQUIREMENTS

1981 and 1980 US Cars

Percent Satisfied	PR Fuels 1981	PR Fuels 1980	PR Fuels Δ	FBRU Fuels 1981	FBRU Fuels 1980	FBRU Fuels Δ	FBRSU Fuels 1981	FBRSU Fuels 1980	FBRSU Fuels Δ
10	84.6	85.1	-0.5	80.2	80.7	-0.5	78.3	79.5	-1.2
20	86.0	86.9	-0.9	81.0	82.2	-1.2	79.4	80.7	-1.3
30	87.2	88.1	-0.9	81.5	82.8	-1.3	80.3	81.3	-1.0
40	88.1	89.0	-0.9	82.2	83.3	-1.1	81.1	81.9	-0.8
50	89.0	89.6	-0.6	83.0	83.8	-0.8	82.0	82.5	-0.5
60	89.9	90.2	-0.3	83.7	84.2	-0.5	82.9	83.1	-0.2
70	90.8	90.8	0.0	84.3	84.8	-0.5	83.7	83.7	0.0
80	91.7	91.7	0.0	85.0	85.6	-0.6	84.7	84.4	0.3
90	92.9	93.0	-0.1	85.9	86.4	-0.5	86.0	85.4	0.6
95	94.4	94.4	0.0	87.2	87.1	0.1	87.5	86.4	1.1
98	96.0	95.3	0.7	H	88.3	-	H	87.6	-
99	96.9	95.7	1.2	H	H	-	H	H	-

TABLE XX

COMPARISON OF MAXIMUM (R+M)/2 OCTANE NUMBER REQUIREMENTS

1981 and 1980 US Cars

Percent Satisfied	PR Fuels			FBRU Fuels			FBRSU Fuels		
	1981	1980	Δ	1981	1980	Δ	1981	1980	Δ
10	84.6	85.1	-0.5	82.9	83.6	-0.7	82.3	83.6	-1.3
20	86.0	86.9	-0.9	84.0	85.5	-1.5	83.6	85.4	-1.8
30	87.2	88.1	-0.9	84.6	86.3	-1.7	84.8	86.3	-1.5
40	88.1	89.0	-0.9	85.7	86.9	-1.2	85.8	87.0	-1.2
50	89.0	89.6	-0.6	86.8	87.5	-0.7	86.9	87.8	-0.9
60	89.9	90.2	-0.3	87.8	88.1	-0.3	88.0	88.6	-0.6
70	90.8	90.8	0.0	88.7	89.0	-0.3	89.1	89.5	-0.4
80	91.7	91.7	0.0	89.5	89.9	-0.4	90.2	90.4	-0.2
90	92.9	93.0	-0.1	90.8	90.9	-0.1	91.9	91.6	0.3
95	94.4	94.4	0.0	92.4	91.8	0.6	93.6	92.7	0.9
98	96.0	95.3	0.7	H	93.3	-	H	94.1	-
99	96.9	95.7	1.2	H	H	-	H	H	-

TABLE XXI

MAXIMUM RESEARCH, MOTOR, AND (R+M)/2 OCTANE NUMBER REQUIREMENTS

1981 Imported Vehicles

Percent Satisfied	PR Fuels	FBRU Fuels			FBRSU Fuels		
		RON	MON	(R+M)/2	RON	MON	(R+M)/2
10	84.4	85.0	79.8	82.4	85.7	77.8	81.8
20	86.0	86.4	80.6	83.5	87.6	79.1	83.4
30	87.3	87.6	81.4	84.5	88.6	79.9	84.2
40	88.2	88.4	81.8	85.1	89.4	80.4	84.9
50	89.0	89.0	82.1	85.6	90.1	80.8	85.5
60	89.7	89.8	82.6	86.2	90.9	81.3	86.1
70	90.9	91.2	83.2	87.2	92.2	82.2	87.2
80	92.9	92.9	84.2	88.6	94.0	83.4	88.7
90	95.0	95.1	85.5	90.3	96.2	85.0	90.6
95	96.8	96.8	86.6	91.7	98.4	86.5	92.4
98	H	H	H	H	H	H	H
99	H	H	H	H	H	H	H

TABLE XXII

COMPARISON OF MAXIMUM RESEARCH OCTANE NUMBER REQUIREMENTS

1981 and 1980 Imported Vehicles

Percent Satisfied	PR Fuels			FBRU Fuels			FBRSU Fuels		
	1981	1980	Δ	1981	1980	Δ	1981	1980	Δ
10	84.4	79.4	5.0	85.0	81.7	3.3	85.7	82.3	3.4
20	86.0	84.5	1.5	86.4	85.7	0.7	87.6	87.3	0.3
30	87.3	86.1	1.2	87.6	87.4	0.2	88.6	89.2	-0.6
40	88.2	87.3	0.9	88.4	88.3	0.1	89.4	90.0	-0.6
50	89.0	88.0	1.0	89.0	89.0	0.0	90.1	90.8	-0.7
60	89.7	88.8	0.9	89.8	89.8	0.0	90.9	91.7	-0.8
70	90.9	89.7	1.2	91.2	90.8	0.4	92.2	92.6	-0.4
80	92.9	90.5	2.4	92.9	91.6	1.3	94.0	93.7	0.3
90	95.0	91.5	3.5	95.1	92.6	2.5	96.2	95.0	1.2
95	96.8	92.8	4.0	96.8	94.1	2.7	98.4	95.9	2.5
98	H	94.2	-	H	95.4	-	H	99.1	-
99	H	94.8	-	H	96.4	-	H	100.2	-

TABLE XXIII

COMPARISON OF MAXIMUM MOTOR OCTANE NUMBER REQUIREMENTS

1981 and 1980 Imported Vehicles

Percent Satisfied	PR Fuels			FBRU Fuels			FBRSU Fuels		
	1981	1980	Δ	1981	1980	Δ	1981	1980	Δ
10	84.4	79.4	5.0	79.8	77.3	2.5	77.8	75.8	2.0
20	86.0	84.5	1.5	80.6	80.2	0.4	79.1	79.2	-0.1
30	87.3	86.1	1.2	81.4	81.3	0.1	79.9	80.2	-0.3
40	88.2	87.3	0.9	81.8	81.9	-0.1	80.4	80.6	-0.2
50	89.0	88.0	1.0	82.1	82.3	-0.2	80.8	81.1	-0.3
60	89.7	88.8	0.9	82.6	82.9	-0.3	81.3	81.6	-0.3
70	90.9	89.7	1.2	83.2	83.5	-0.3	82.2	82.2	0.0
80	92.9	90.5	2.4	84.2	84.0	0.2	83.4	82.8	0.6
90	95.0	91.5	3.5	85.5	84.6	0.9	85.0	83.5	1.5
95	96.8	92.8	4.0	86.6	85.6	1.0	86.5	84.0	1.5
98	H	94.2	-	H	86.4	-	H	86.4	-
99	H	94.8	-	H	86.9	-	H	87.3	-

TABLE XXIV

COMPARISON OF MAXIMUM (R+M)/2 OCTANE NUMBER REQUIREMENTS

1981 and 1980 Imported Vehicles

Percent Satisfied	PR Fuels 1981	PR Fuels 1980	PR Fuels Δ	FBRU Fuels 1981	FBRU Fuels 1980	FBRU Fuels Δ	FBRSU Fuels 1981	FBRSU Fuels 1980	FBRSU Fuels Δ
10	84.4	79.4	5.0	82.4	79.5	2.9	81.8	79.0	2.8
20	86.0	84.5	1.5	83.5	82.9	0.6	83.4	83.3	0.1
30	87.3	86.1	1.2	84.5	84.4	0.1	84.2	84.7	-0.5
40	88.2	87.3	0.9	85.1	85.1	0.0	84.9	85.3	-0.4
50	89.0	88.0	1.0	85.6	85.6	0.0	85.5	86.0	-0.5
60	89.7	88.8	0.9	86.2	86.4	-0.2	86.1	86.7	-0.6
70	90.9	89.7	1.2	87.2	87.2	0.0	87.2	87.4	-0.2
80	92.9	90.5	2.4	88.6	87.8	0.8	88.7	88.3	0.4
90	95.0	91.5	3.5	90.3	88.6	1.7	90.6	89.2	1.4
95	96.8	92.8	4.0	91.7	89.8	1.9	92.4	90.0	2.4
98	H	94.2	-	H	90.9	-	H	92.8	-
99	H	94.8	-	H	91.7	-	H	93.8	-

TABLE XXV

50TH PERCENTILE ACCELERATION TECHNIQUE

FBRU OCTANE NUMBER REQUIREMENTS

1981 US and Imported Vehicles

(414 Vehicles)

Percent Satisfied	Research Octane Number	Motor Octane Number	(R+M)/2 Octane Number
10	83.5	78.8	81.1
20	85.1	79.8	82.5
30	86.1	80.4	83.3
40	87.0	81.0	84.0
50	88.1	81.7	84.9
60	89.7	82.5	86.1
70	91.0	83.2	87.1
80	92.3	83.9	88.1
90	94.3	85.1	89.7
95	95.9	85.9	90.9
98	97.4	87.0	92.2
99	98.8	88.0	93.4

TABLE XXVI

50TH PERCENTILE ACCELERATION TECHNIQUE

FBRU OCTANE NUMBER REQUIREMENTS

1981 US and Imported Cars

(389 Cars)

Percent Satisfied	Research Octane Number	Motor Octane Number	(R+M)/2 Octane Number
10	83.1	78.6	80.8
20	84.8	79.7	82.2
30	85.8	80.3	83.1
40	86.8	80.8	83.8
50	87.7	81.4	84.6
60	89.1	82.2	85.6
70	90.5	83.0	86.7
80	92.0	83.7	87.8
90	93.7	84.7	89.2
95	95.9	86.0	90.9
98	97.6	87.1	92.4
99	99.2	88.2	93.7

TABLE XXVII

50TH PERCENTILE ACCELERATION TECHNIQUE

FBRU OCTANE NUMBER REQUIREMENTS

1981 US Vehicles

(316 Vehicles)

Percent Satisfied	Research Octane Number	Motor Octane Number	(R+M)/2 Octane Number
10	83.9	79.2	81.5
20	85.4	80.0	82.7
30	86.5	80.7	83.6
40	87.7	81.5	84.6
50	89.3	82.3	85.8
60	90.5	82.9	86.7
70	91.4	83.4	87.4
80	92.6	84.0	88.3
90	94.5	85.2	89.9
95	96.1	86.1	91.1
98	97.8	87.2	92.5
99	99.3	88.3	93.8

TABLE XXVIII

50TH PERCENTILE ACCELERATION TECHNIQUE

FBRU OCTANE NUMBER REQUIREMENTS

1981 US Cars

(298 Cars)

Percent Satisfied	Research Octane Number	Motor Octane Number	(R+M)/2 Octane Number
10	83.6	78.9	81.2
20	85.1	79.8	82.5
30	86.2	80.5	83.4
40	87.3	81.2	84.3
50	88.7	82.0	85.4
60	90.0	82.7	86.4
70	91.0	83.2	87.1
80	92.3	83.9	88.1
90	94.1	84.9	89.5
95	96.2	86.1	91.1
98	98.0	87.4	92.7
99	99.7	88.6	94.1

TABLE XXIX

50TH PERCENTILE ACCELERATION TECHNIQUE

FBRU OCTANE NUMBER REQUIREMENTS

1981 Imported Vehicles

(98 Vehicles)

Percent Satisfied	Research Octane Number	Motor Octane Number	(R+M)/2 Octane Number
10	82.6	78.2	80.4
20	84.5	79.5	82.0
30	85.5	80.1	82.8
40	86.2	80.6	83.4
50	86.9	81.0	83.9
60	87.6	81.4	84.5
70	88.5	81.8	85.2
80	90.9	83.2	87.0
90	93.5	84.6	89.0
95	95.4	85.7	90.6
98	96.5	86.4	91.4
99	97.2	86.9	92.0

TABLE XXX

COMPARISON OF MAXIMUM WITH 50TH PERCENTILE ACCELERATION TECHNIQUE

FBRU RESEARCH OCTANE NUMBER REQUIREMENTS

1981 US and Imported Vehicles

Percent Satisfied	Maximum Octane Number (417 Veh)	50th Percentile Octane Number (414 Veh)	Δ
10	85.5	83.5	2.0
20	87.0	85.1	1.9
30	88.0	86.1	1.9
40	89.1	87.0	2.1
50	90.3	88.1	2.2
60	91.6	89.7	1.9
70	92.8	91.0	1.8
80	94.0	92.3	1.7
90	96.1	94.3	1.8
95	97.9	95.9	2.0
98	H	97.4	-
99	H	98.8	-

TABLE XXXI

COMPARISON OF VEHICLES WITH 50TH PERCENTILE ACCELERATION TECHNIQUE REQUIREMENTS GREATER THAN MAXIMUM REQUIREMENTS

FBRU Fuels

		Maximum Requirement Data			50th Percentile Acceleration Technique Requirement Data				
Observation No.	Vehicle Code	Requirement	RPM	MV	Requirement	RPM	MV	MPH	Mode
159	IIA 238	87	1600	1.4	88	1500	2.0	40	1 and 2
235	KL 22M	95	1900	2.0	96	2900	3.0	53	1 and 2
365	MCB 223	90	3550	0.8	92	3800	0.9	58	2
335	NLG 216M	82	850	1.0	85	1200	1.0	25	1 and 2
314	MCS 223	91.5	2900	0.6	93	2500	1.0	53	1 and 2
367	T 213M	84	2700	0.8	85	2800	0.8	40	1 and 2
215	NH 450	94	2100	1.0	95	2200	6.0	50	2
41	Q 218M	86	2700	1.8	87	2900	2.0	35	2
224	NH 450	86	2550	1.5	87	1850	4.0	34	1 and 2
80	OL 216M	90	1600	0.2	90.5	1800	0.2	40	2
15	EF 20	86.5	2500	0.6	87.5	1900	4.6	25	1
144	OCA 223	89	2700	1.6	90	2700	1.5	50	2
232	OV 242	92	1650	1.5	93	1900	1.4	47	1
153	OV 250	92	1400	0.6	93	1400	0.6	45	1
301	SF 50	92	1400	0.3	92.5	1100	1.0	24	1
16	PL 217	83	2250	0.9	84.5	2100	1.2	34	2

TABLE XXXII

MAXIMUM OCTANE NUMBER REQUIREMENTS - 1981 SELECT MODELS

Model	No. Tested	PR	Research Octane No. FBRU	Research Octane No. FBRSU	Motor Octane No. FBRU	Motor Octane No. FBRSU	(R+M)/2 Octane No. FBRU	(R+M)/2 Octane No. FBRSU
		50% Satisfied						
HIA 238	14	88.3	88.8	90.0	82.0	80.8	85.4	85.4
IIA 238/LIA 238	30	89.8	91.6	93.2	83.6	82.9	87.6	88.0
NCX 228/HCX 228/ ICX 228/LCX 228	19	84.6	85.4	86.9	79.9	78.6	82.7	82.7
NC5 225/HC5 225/ IC5 225/LC5 225	24	90.0	92.5	94.7	84.1	83.9	88.3	89.3
OL 216/ML 216	14	91.3	92.0	93.1	83.8	82.8	87.9	88.0
OL 216M/ML 216M	13	90.7	91.6	92.2	83.5	82.2	87.5	87.2
OCA 223/MCA 223	16	89.3	90.1	91.4	82.7	81.7	86.4	86.6
PL 217/KL 217	14	82.4	84.5	86.5	79.2	78.3	81.9	82.4
PC 222/KC 222	24	84.3	85.8	87.1	80.1	78.7	82.9	82.9
		90% Satisfied						
HIA 238	14	90.7	92.1	93.9	83.8	83.4	87.9	88.6
IIA 238/LIA 238	30	94.0	97.0	99.8	86.8	87.5	91.9	93.7
NCX 228/HCX 228/ ICX 228/LCX 228	19	88.2	89.3	91.6	82.4	81.8	85.9	86.7
NC5 225/HC5 225/ IC5 225/LC5 225	24	93.8	97.6	99.9	87.0	87.5	92.2	93.7
OL 216/ML 216	14	95.9	96.6	97.8	86.4	86.1	91.5	92.0
OL 216M/ML 216M	13	94.3	94.8	96.2	85.3	84.9	90.0	90.5
OCA 223/MCA 223	16	92.4	93.8	94.8	84.7	84.0	89.2	89.4
PL 217/KL 217	14	86.6	89.0	92.2	82.6	82.4	85.8	87.3
PC 222/KC 222	24	89.8	91.2	93.2	83.6	83.0	87.4	88.1

TABLE XXXIII

OWNER/RATER COMPARISON OF TANK FUEL KNOCK

(1974-1981 CRC Octane Number Requirement Surveys)

	1981	1980	1979	1978	1977	1976	1975	1974
Fuel:	Unleaded	Unleaded	Unleaded**	Unleaded**	Unleaded**	Unleaded**	Unleaded**	Mixed*
(No. of Reports):	(149)	(218)	(196)	(105)	(225)	(200)	(216)	(170)
% Knocking								
Trained Rater	43.6	51.1	52.6	50.5	54.7	63.8	89.4	24.7
Owner	29.5	31.2	26.0	32.4	29.3	40.5	21.8	11.2
% Owners Objecting								
Based on Total Reports	12.1	15.1	15.8	15.2	10.2	20.0	9.7	4.1
Based on Those Reporting Knock	40.9	48.5	60.8	46.9	34.8	49.4	44.5	36.6
Owner/Rater Ratio	0.68	0.61	0.49	0.64	0.54	0.63	0.24	0.45

* Mixed: Premium, regular, and subregular grades.

** Some vehicles were designed for leaded fuels.

TABLE XXXIV

TANK-FUEL KNOCK REPORTED BY TRAINED RATERS

I. All Vehicles

Model	No. in Survey	Cars Tested on Tank Fuel: No. Tested*	No. Knocking	% Knocking (Weighted Population)
1981	417	326		42.9
1980	429	374		49.9
1979	490	414		47.3
1978	434	338		47.2
1977	478	457		44.2

II. 1981 Select Models

Model	No. in Survey	No. Tested*	No. Knocking	% Knocking
HIA 238	14	13	1	7.7
IIA 238/LIA 238	30	18	10	55.6
NCX 228/HCX 228/ ICX 228/LCX 228	19	17	3	17.6
NC5 225/HC5 225/ IC5 225/LC5 225	24	19	13	68.4
OL 216/ML 216	14	9	7	77.8
OL 216M/ML 216M	13	9	6	66.7
OCA 223/MCA 223	16	13	10	76.9
PL 217/KL 217	14	12	1	8.3
PC 222/KL 222	24	20	3	15.0

* Tank-fuel tests were optional when owner questionnaires were not obtained.

TABLE XXXV

1981 VEHICLES REPORTED TO AFTER-RUN ON TANK FUEL

	Total Observations		Both Owner/Rater Data No Spark Adjustment	
	Owner	Rater	Owner	Rater
Vehicles Tested	169	309	148	148
After-Run Reported	19	9	18	5

AFTER-RUN REPORTED BY OWNER

(Vehicle Received with Spark at Manufacturer's Recommended Setting)

Obs. No.	Vehicle Code	FBRU Maximum RON Requirement	Tank Fuel RON	Tank Fuel MON
167	KL 217	85.0	92.3	83.4
253	KL 217	86.0	91.4	83.5
14	KC 222	84.5	-	-
237	KC 222	90.0	93.5	83.9
256	LIA 238	94.0	92.4	83.6
319	MCB 133	93.0	90.9	83.0
264	MCS 223M	99.0	92.0	83.2
233	MI 242	91.5	92.5	83.1
89	NIK 238	90.0	92.5	82.2
163	NIK 238	98.0	91.7	82.5
187	NIK 238	94.0	95.1	85.6
204	OL 216M	90.0	90.7	83.4
309	OCS 223M	94.0	91.6	82.7
305	O V250	91.0	91.6	82.7
200	PL 217	85.0	91.8	84.3
101	PC 222	82.0	92.0	83.2
239	PC 226	90.0	92.7	83.4
247	T 224	88.0	94.0	83.8

TABLE XXXVI

ENGINE SPEEDS FOR MAXIMUM OCTANE NUMBER REQUIREMENTS - 1981 SELECT MODELS

% of Cars Having Maximum Requirements Within Specified Speed (rpm) Ranges

Model:	HIA 238			IIA 238/LIA 238			NCX 228/HCX 228/ ICX 228/LCX 228		
Fuel:	PR	FBRU	FBRSU	PR	FBRU	FBRSU	PR	FBRU	FBRSU
SPEED RANGE									
1599 and Lower	14	7		30	30	37			
1600 - 1999	72	65	57	64	60	53	5		
2000 - 2399	7	21	29	3	3	3	42	47	53
2400 - 2799	7	7	7	3			48	53	42
2800 - 3199			7		7	7	5		5
3200 and Higher									
No. of Cars	14	14	14	30	30	30	19	19	19

Model:	NC5 225/HC5 225/ IC5 225/LC5 225			OL 216/ML 216			OL 216M/ML 216M		
Fuel:	PR	FBRU	FBRSU	PR	FBRU	FBRSU	PR	FBRU	FBRSU
SPEED RANGE									
1599 and Lower				14	21	29	84	69	62
1600 - 1999	13	4	4	57	72	50	8	23	23
2000 - 2399	33	33	25	29	7	7	8		
2400 - 2799	50	55	58			14			
2800 - 3199									
3200 and Higher	4	8	13					8	15
No. of Cars	24	24	24	14	14	14	13	13	13

TABLE XXXVI
(Continued)

ENGINE SPEEDS FOR MAXIMUM OCTANE NUMBER REQUIREMENTS - 1981 SELECT MODELS

% of Cars Having Maximum Requirements Within Specified Speed (rpm) Ranges

Model:	OCA 223/MCA 223			PL 217/KL 217			PC 222/KC 222		
Fuel:	PR	FBRU	FBRSU	PR	FBRU	FBRSU	PR	FBRU	FBRSU
SPEED RANGE									
1599 and Lower									
1600 - 1999							35	17	9
2000 - 2399	19	6	19	61	69	62	52	70	82
2400 - 2799	69	75	50	31	23	38	13	13	9
2800 - 3199	12	6	19						
3200 and Higher		13	12	8	8				
No of Cars	16	16	16	14*	14*	14*	24*	24*	24*

* One car had a requirement of L (<78 RON)

TABLE XXXVII

ENGINE SPEEDS FOR MAXIMUM AND 50TH PERCENTILE

ACCELERATION TECHNIQUE OCTANE NUMBER REQUIREMENTS

Weighted % of Vehicles Having Requirements
in Indicated (rpm) Ranges

All 1981 Vehicles

Maximum Requirements Engine Speed Range	PR Fuels	FBRU Fuels	FBRSU Fuels
1599 and Lower	26.6	24.7	23.3
1600 - 1999	32.2	30.0	29.8
2000 - 2399	21.9	19.8	18.2
2400 - 2799	15.7	16.7	15.9
2800 - 3199	2.9	4.5	6.7
3200 and Higher	0.7	4.3	6.2
50th Percentile Acceleration Technique Engine Speed Range			
1599 and Lower	-	16.4	-
1600 - 1999	-	26.3	-
2000 - 2399	-	25.7	-
2400 - 2799	-	19.7	-
2800 - 3199	-	8.7	-
3200 and Higher	-	3.2	-

TABLE XXXVIII

ENGINE SPEEDS FOR FBRU 50TH PERCENTILE ACCELERATION TECHNIQUE

OCTANE NUMBER REQUIREMENTS

1981 Select Models

		% of Cars Having Requirements Within rpm Ranges					
Model	No. of Cars	1599 and Lower	1600-1999	2000-2399	2400-2799	2800-3199	3200 and Higher
HIA 238	14	14	58	7	7	14	
IIA 238/LIA 238	30	40	37	23			
NCX 228/HCX 228/ ICX 228/LCX 228	19			31	53	16	
NC5 225/HC5 225/ IC5 225/LC5 225	24		4	29	50	4	13
OL 216/ML 216	14	7	50	36	7		
OL 216M/ML 216M	13		31	15	31	8	15
OCA 223/MCA 223	16			13	56	25	6
PL 217/KL 217	14*			75	8	17	
PC 222/KC 222	23*		19	67	14		

* Two cars had requirements of L (<78 RON)

TABLE XXXIX

MILES PER HOUR FOR FBRU 50TH PERCENTILE

ACCELERATION TECHNIQUE OCTANE NUMBER REQUIREMENTS

	No. of Cars	MPH Avg.	% of Cars Having Requirements Within MPH Ranges						
			0-9	10-19	20-29	30-39	40-49	50-59	60
I. SELECT MODELS									
HIA 238	14	46.0				7	64	29	
IIA 238/LIA 238	30	42.5			6	27	40	27	
NCX 228/HCX 228/ ICX 228/LCX 228	19	47.0				21	26	53	
NC5 225/HC5 225/ IC5 225/LC5 225	24	48.5				13	33	50	4
OL 216/ML 216	14	39.2				43	57		
OL 216M/ML 216M	13	43.4				31	38	23	8
OCA 223/MCA 223	16	51.0			6		13	81	
PL 217/KL 217	14*	38.1				66	17	17	
PC 222/KC 222	23*	39.2			10	42	38	10	
II. POPULATION (Weighted)									
US and Imported Vehicles (132 Models)	414**	42.8	0.5	0.0	5.6	27.9	35.7	29.6	0.7

* Two cars had requirements of L (<78 RON)

** Five Vehicles had requirements of L (<78 RON)

TABLE XL

ROAD OCTANE DEPRECIATION OF 1981 FBRU AND FBRSU FUELS

All 1981 Vehicles

	FBRU Fuels				FBRSU Fuels			
RON	% Satisfied	Sensi-tivity	Road Octane Rating	Depre-ciation	% Satisfied	Sensi-tivity	Road Octane Rating	Depre-ciation
84	4.9	4.8	83.2	0.8	3.3	7.5	-	-
85	7.7	5.2	84.2	0.8	5.0	7.5	-	-
86	12.6	5.6	85.1	0.9	8.5	8.0	84.2	1.8
87	20.2	6.0	86.3	0.7	13.7	8.3	85.2	1.8
88	30.0	6.4	87.4	0.6	19.8	8.6	86.4	1.6
89	39.4	6.9	88.4	0.6	27.9	8.9	87.2	1.8
90	47.6	7.3	89.1	0.9	37.6	9.2	88.2	1.8
91	54.9	7.8	89.8	1.2	47.2	9.6	89.0	2.0
92	62.7	8.3	90.5	1.5	54.6	9.9	89.6	2.4
93	71.6	8.7	91.2	1.8	61.9	10.2	90.2	2.8
94	79.8	9.1	92.3	1.7	69.7	10.6	91.0	3.0
95	85.7	9.5	93.0	2.0	75.8	10.9	91.7	3.3
96	89.5	10.0	93.8	2.2	82.0	11.2	92.6	3.4
97	92.7	10.3	94.5	2.5	87.6	11.5	93.2	3.8
98	95.2	10.6	95.3	2.7	91.5	11.8	94.2	3.8
99	97.3	10.9	-	-	93.9	12.1	94.7	3.3
100	-	-	-	-	95.5	12.4	-	-
101	-	-	-	-	96.5	12.7	-	-

FIGURE 1

DISTRIBUTION OF ODOMETER MILEAGE
FOR 1981 MODEL VEHICLES TESTED

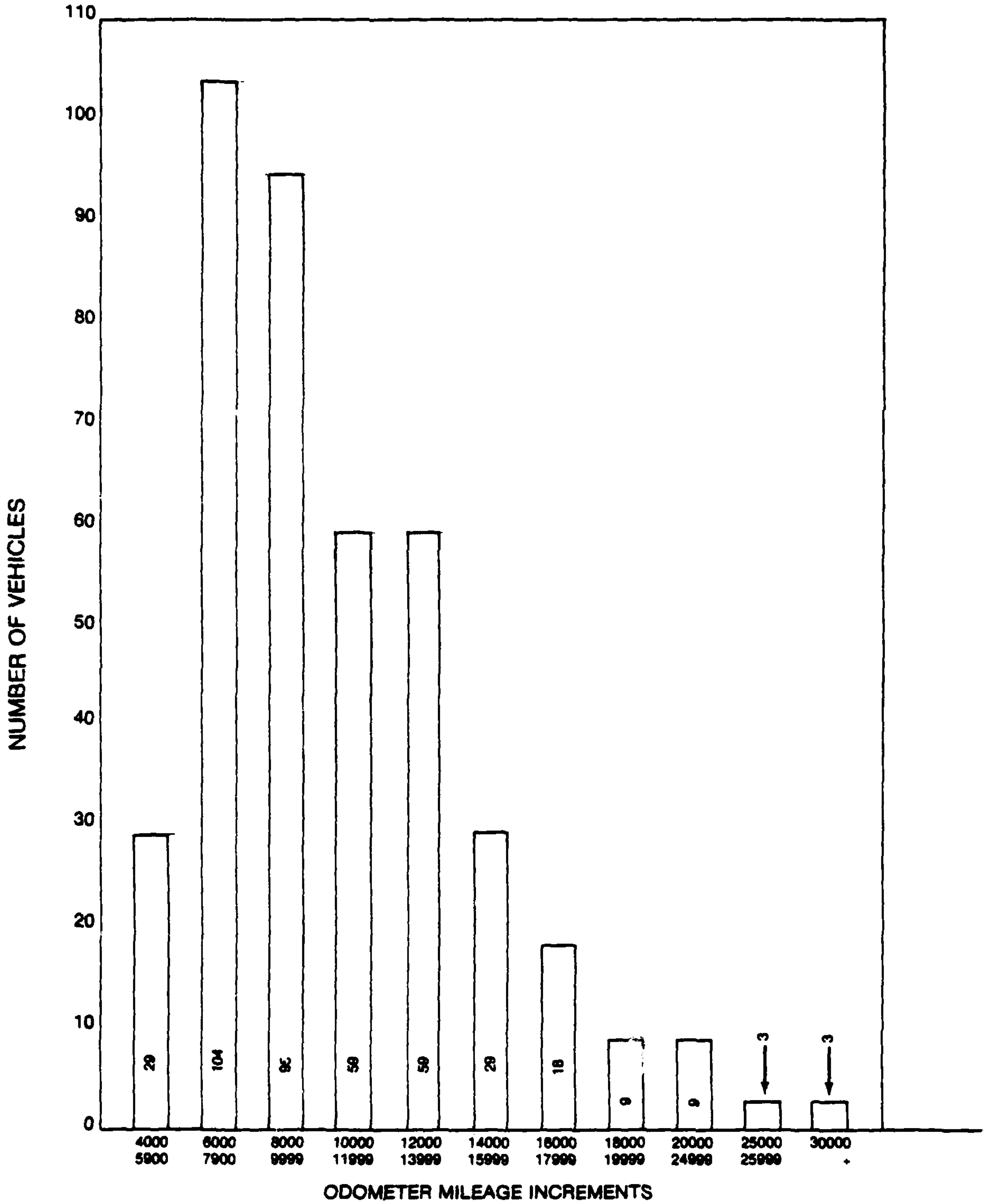


FIGURE 2a

DISTRIBUTION OF
MAXIMUM RON REQUIREMENTS
1981 U.S. AND IMPORTED VEHICLES

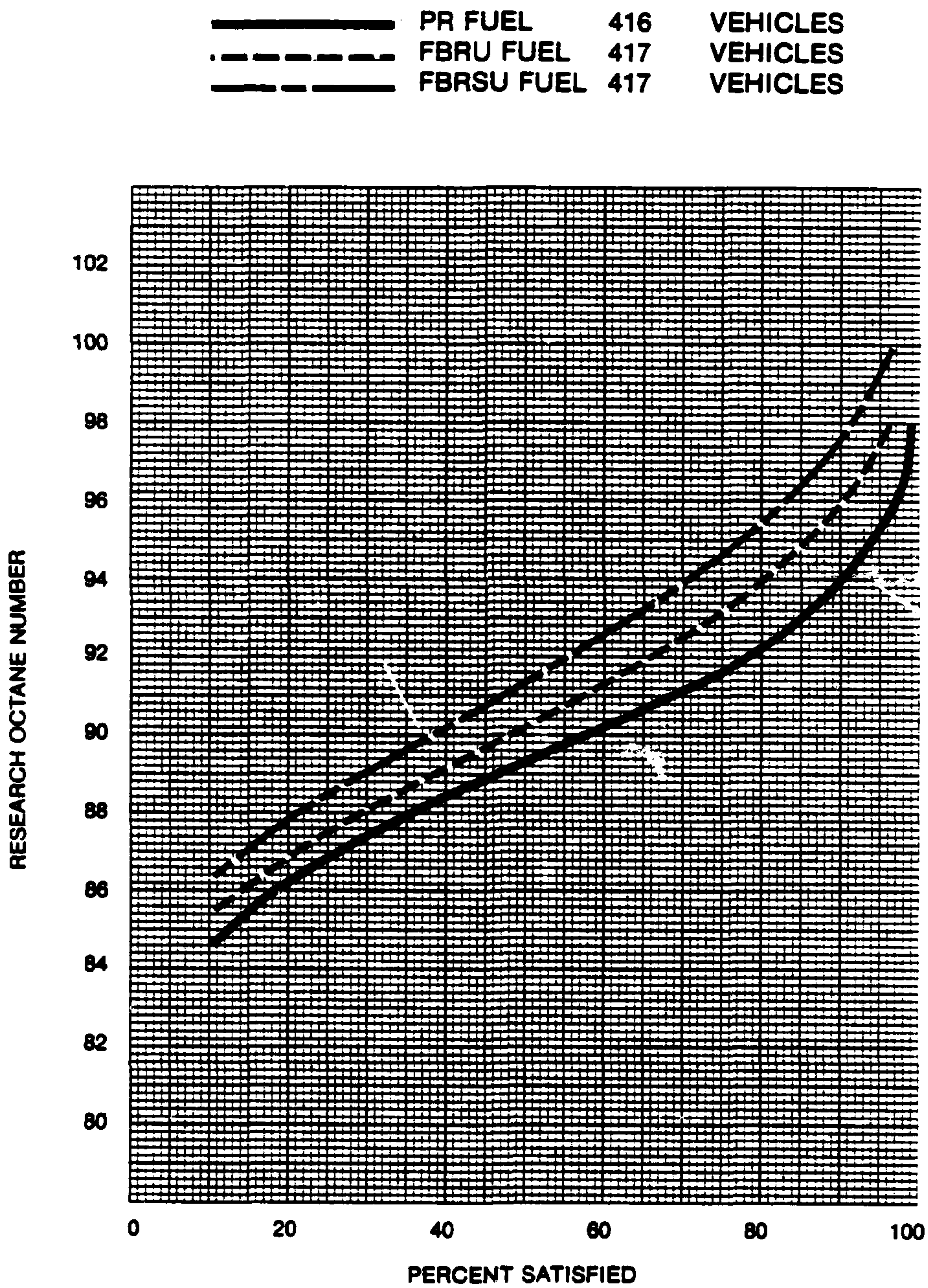


FIGURE 2b

DISTRIBUTION OF MAXIMUM RON REQUIREMENTS
1981 U.S. AND IMPORTED VEHICLES

———	PR FUEL	416	VEHICLES
—·—·—	FBRU FUEL	417	VEHICLES
— — —	FBRSU FUEL	417	VEHICLES

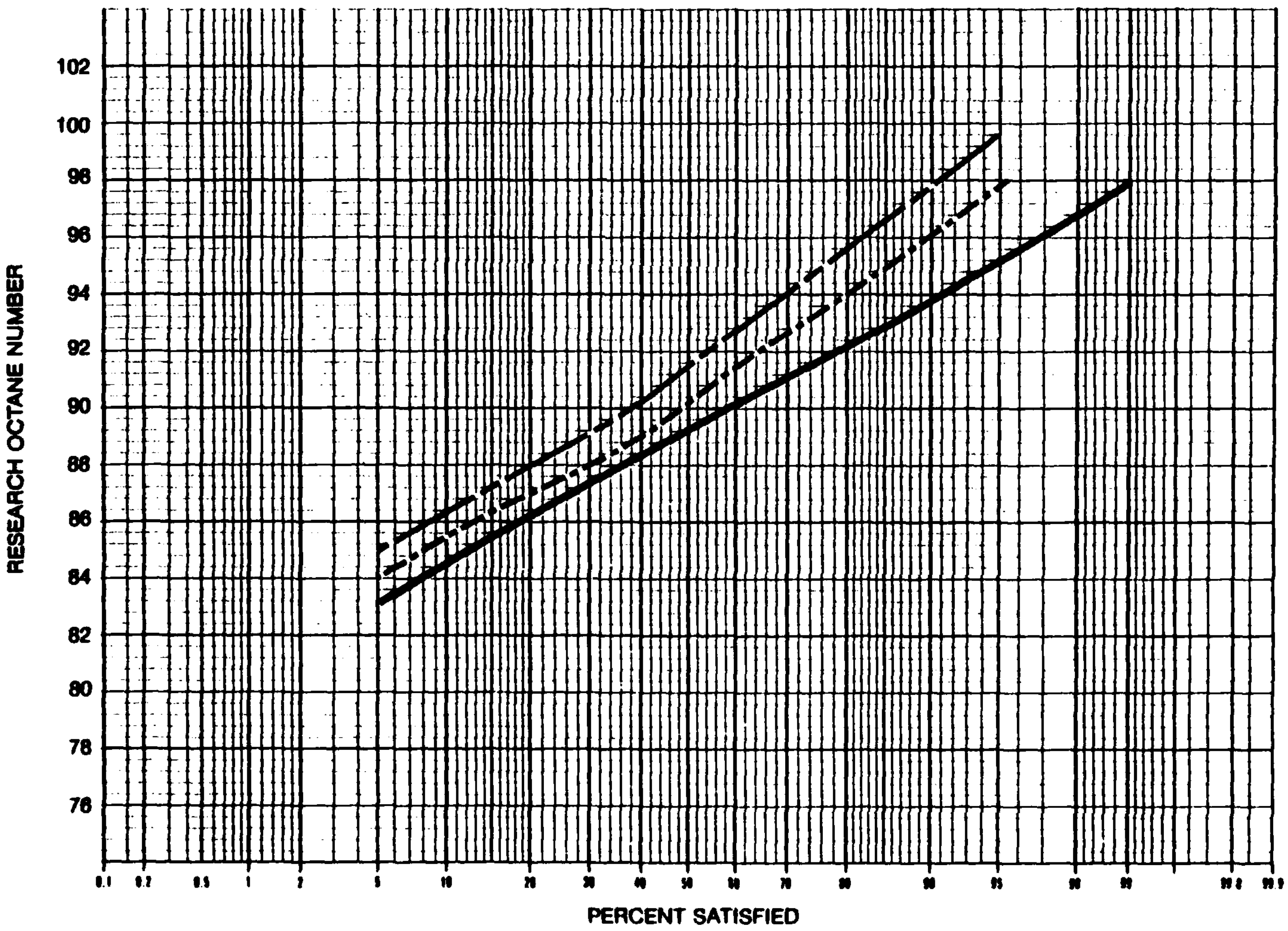


FIGURE 3

COMPARISON OF
MAXIMUM PR FUEL REQUIREMENTS
1981 AND 1980 U.S. AND IMPORTED VEHICLES

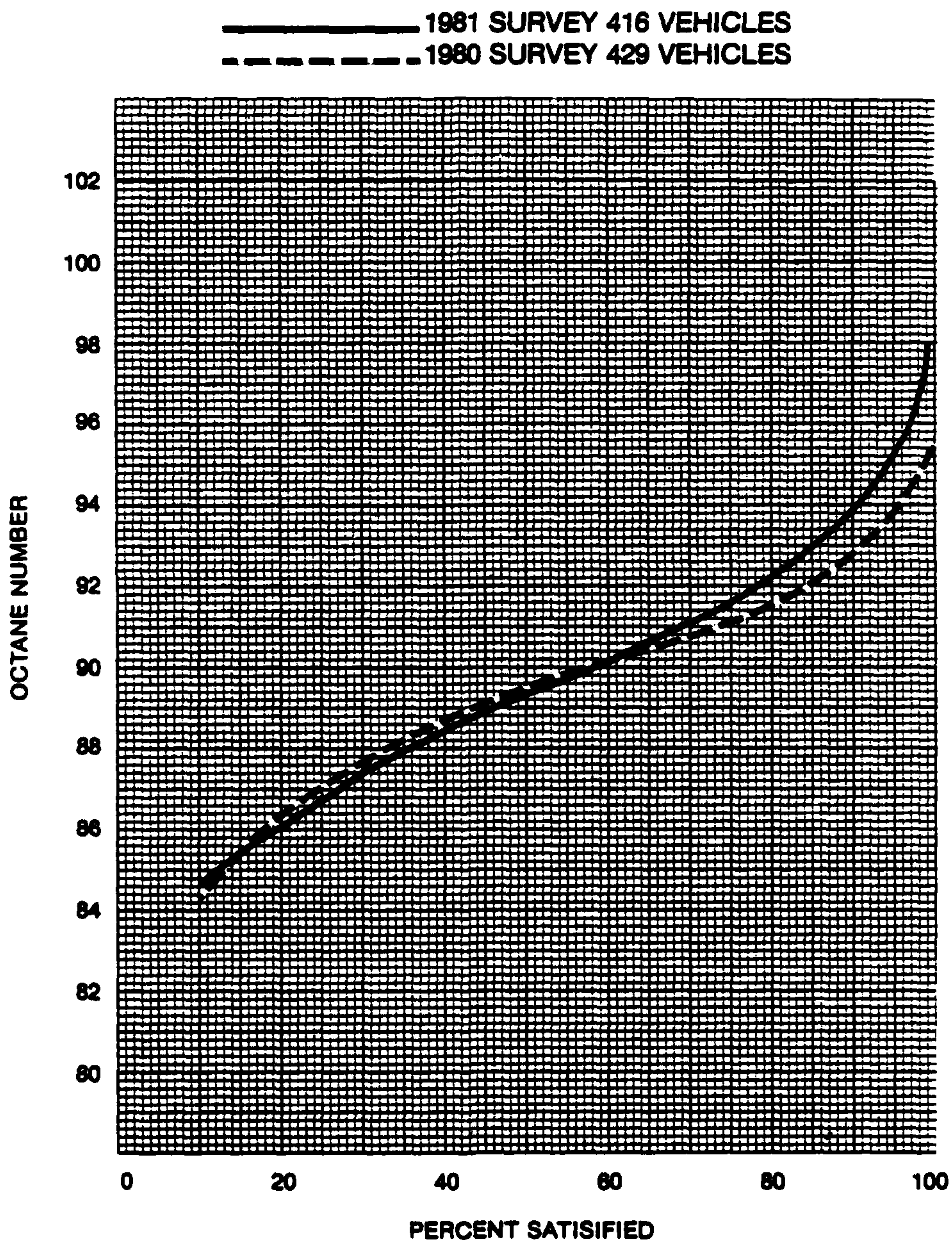


FIGURE 4

COMPARISON OF
MAXIMUM FBRU FUEL RON REQUIREMENTS
1981 AND 1980 U.S. AND IMPORTED VEHICLES

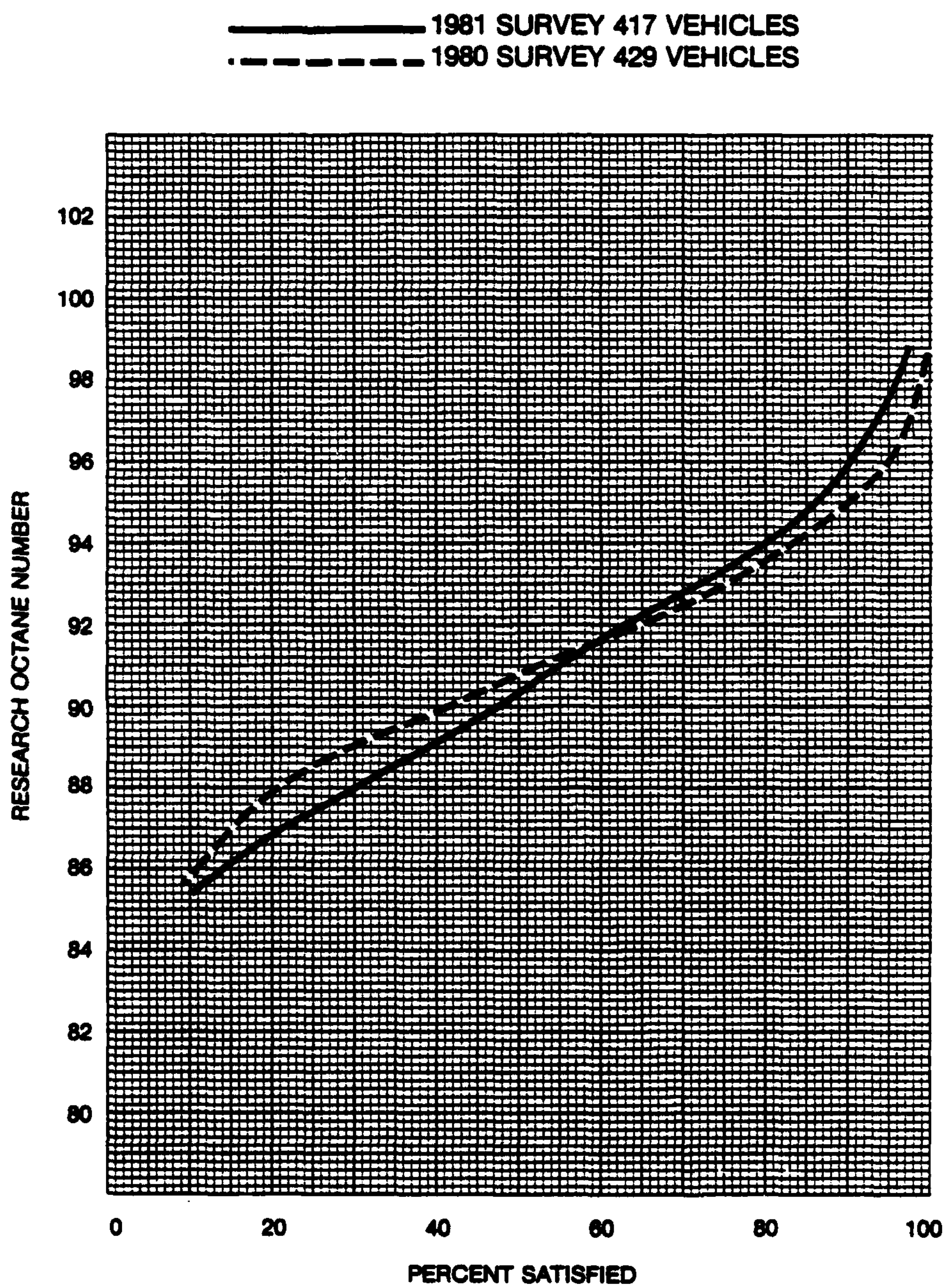


FIGURE 5

COMPARISON OF
MAXIMUM FBRSU FUEL RON REQUIREMENTS
1981 AND 1980 U.S. AND IMPORTED VEHICLES

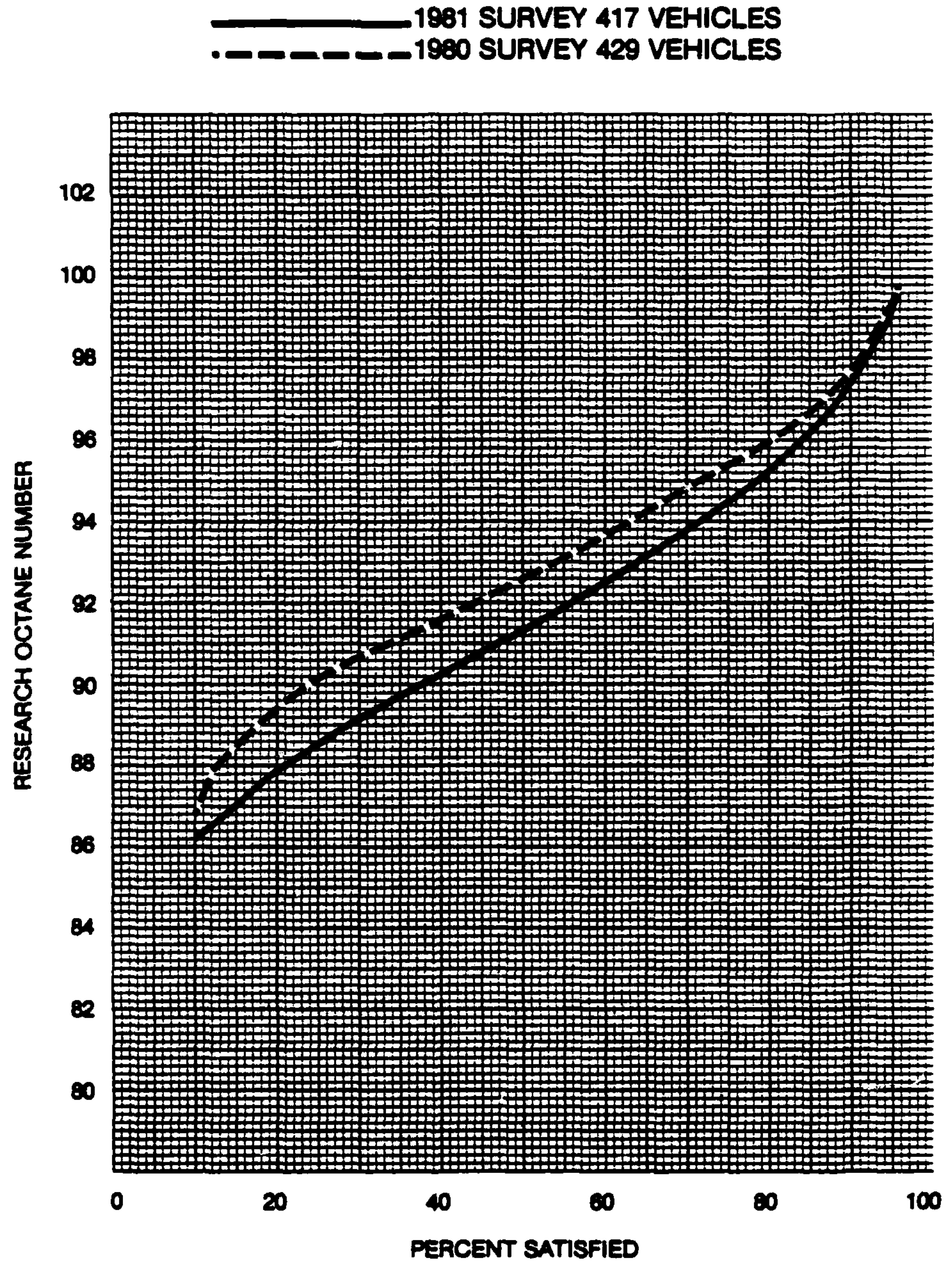


FIGURE 6a

DISTRIBUTION OF MAXIMUM RON REQUIREMENTS - 1981 U.S. VEHICLES

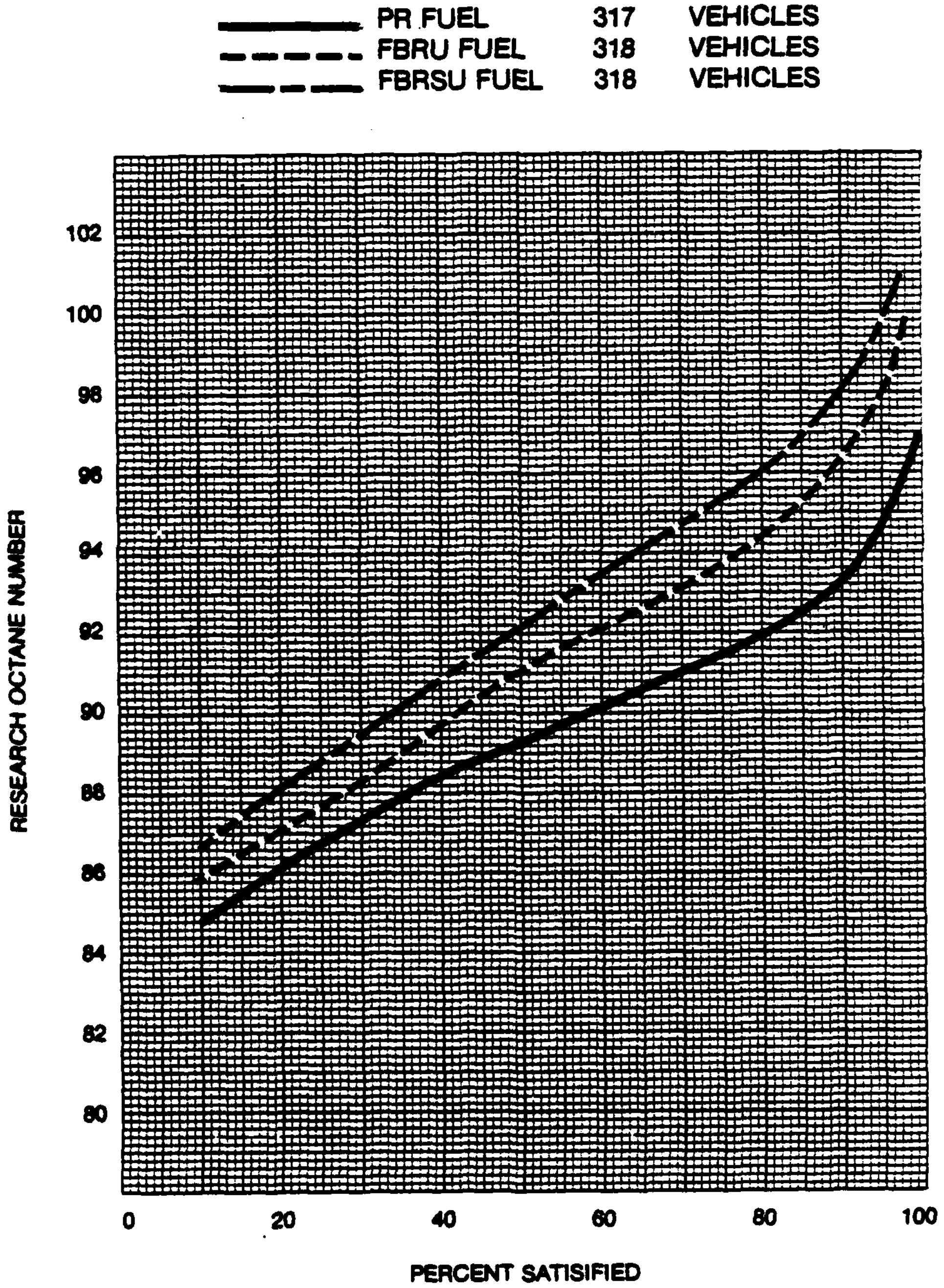


FIGURE 6b

DISTRIBUTION OF MAXIMUM RON REQUIREMENTS
1981 U.S. VEHICLES

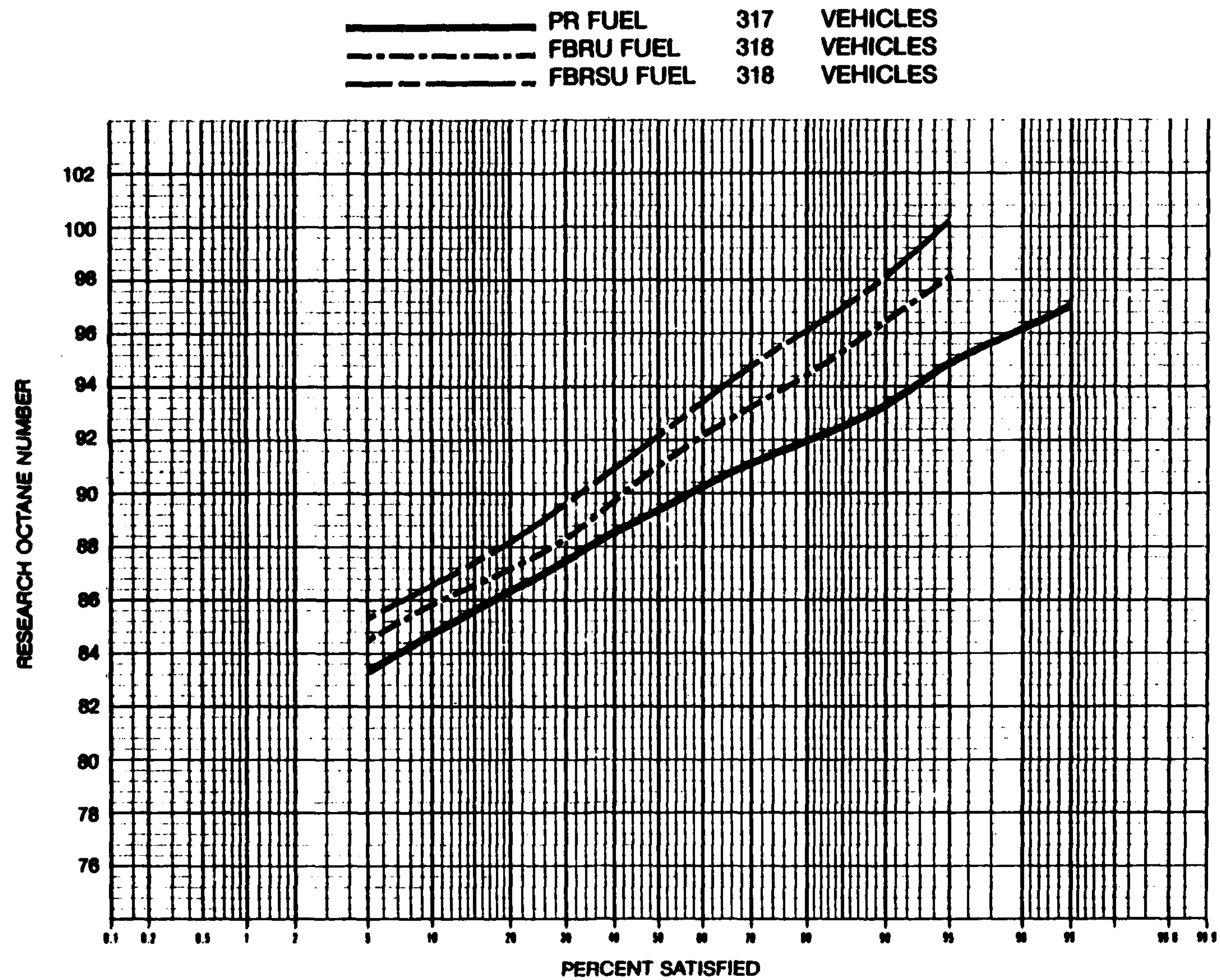


FIGURE 7

COMPARISON OF
MAXIMUM PR FUEL REQUIREMENTS
1981 AND 1980 US. VEHICLES

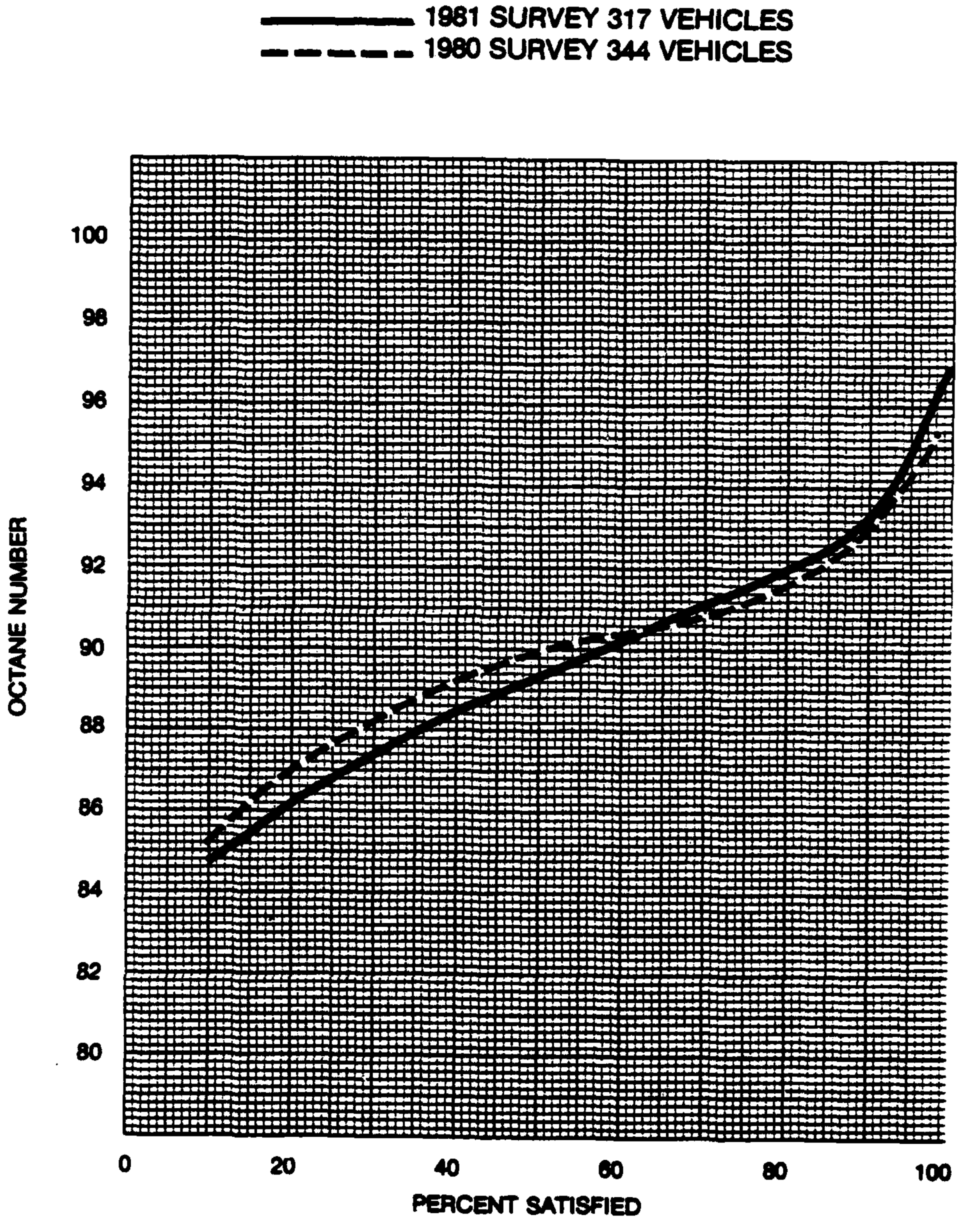


FIGURE 8

COMPARISON OF
MAXIMUM FBRU FUEL REQUIREMENTS
1981 AND 1980 U.S. VEHICLES

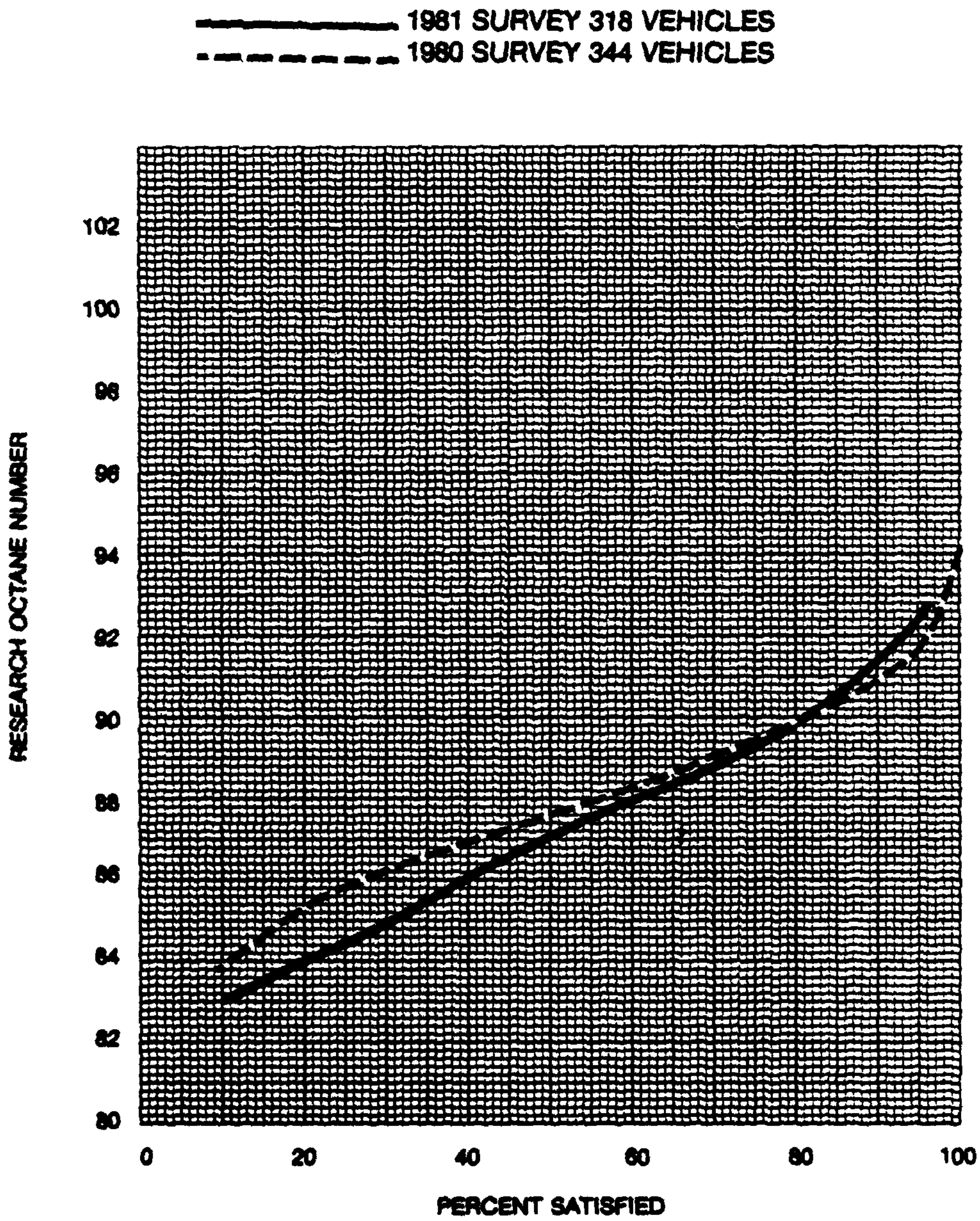


FIGURE 9

COMPARISON OF
MAXIMUM FBRSU FUEL REQUIREMENTS
1981 AND 1980 U.S. VEHICLES

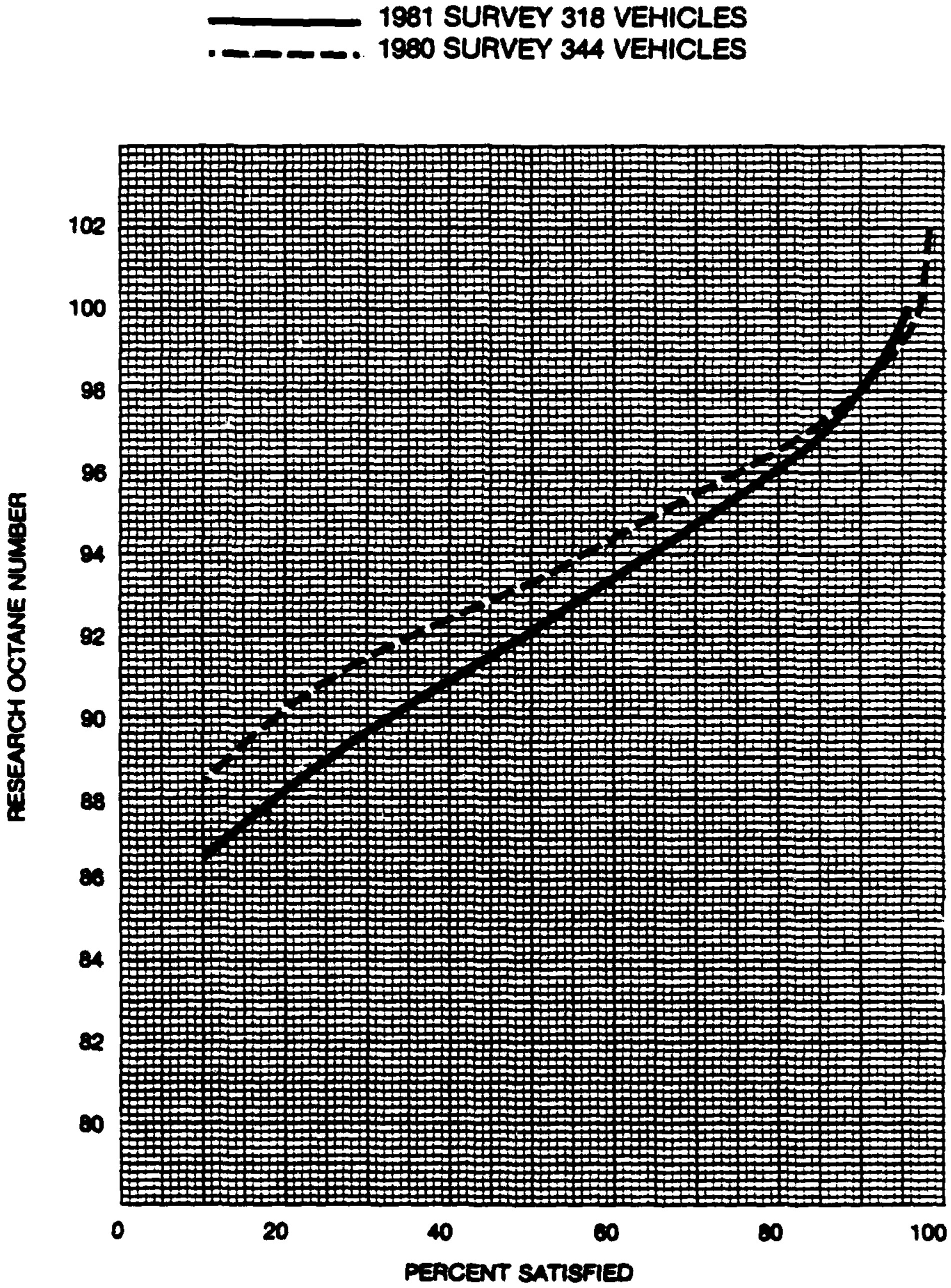


FIGURE 10a

DISTRIBUTION OF
MAXIMUM RON REQUIREMENTS
1981 *IMPORTED VEHICLES*

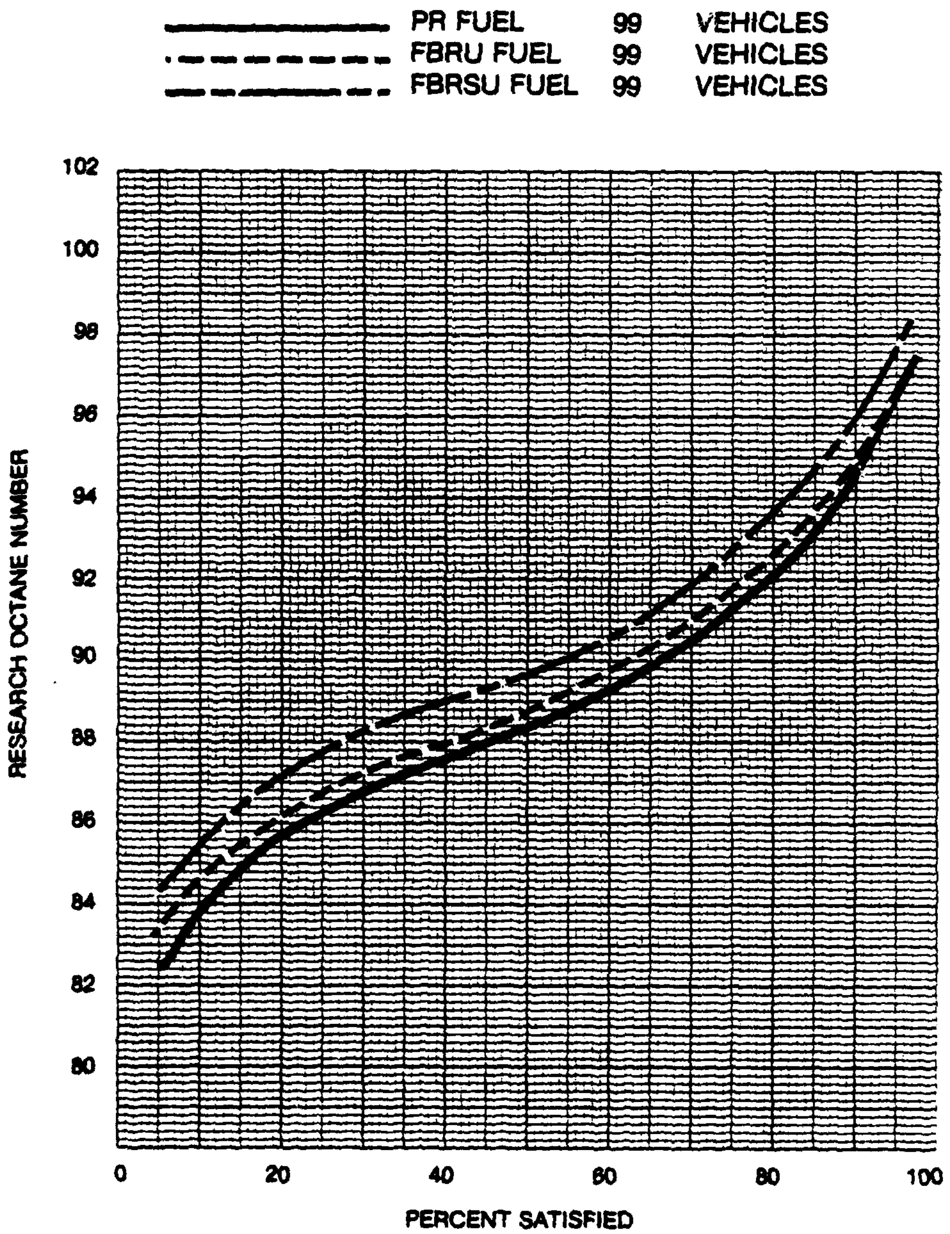


FIGURE 10b

DISTRIBUTION OF MAXIMUM RON REQUIREMENTS
1981 IMPORTED VEHICLES

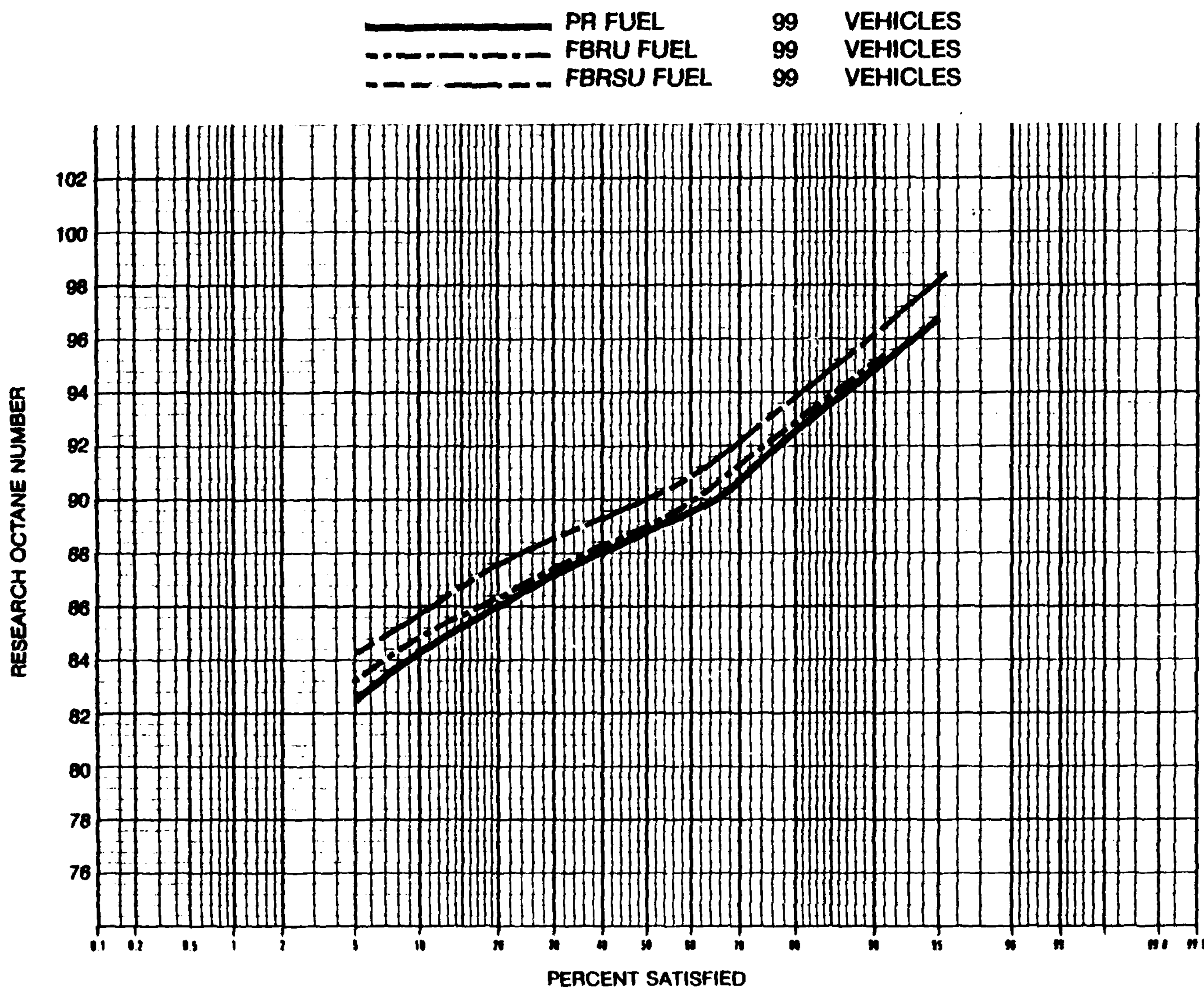
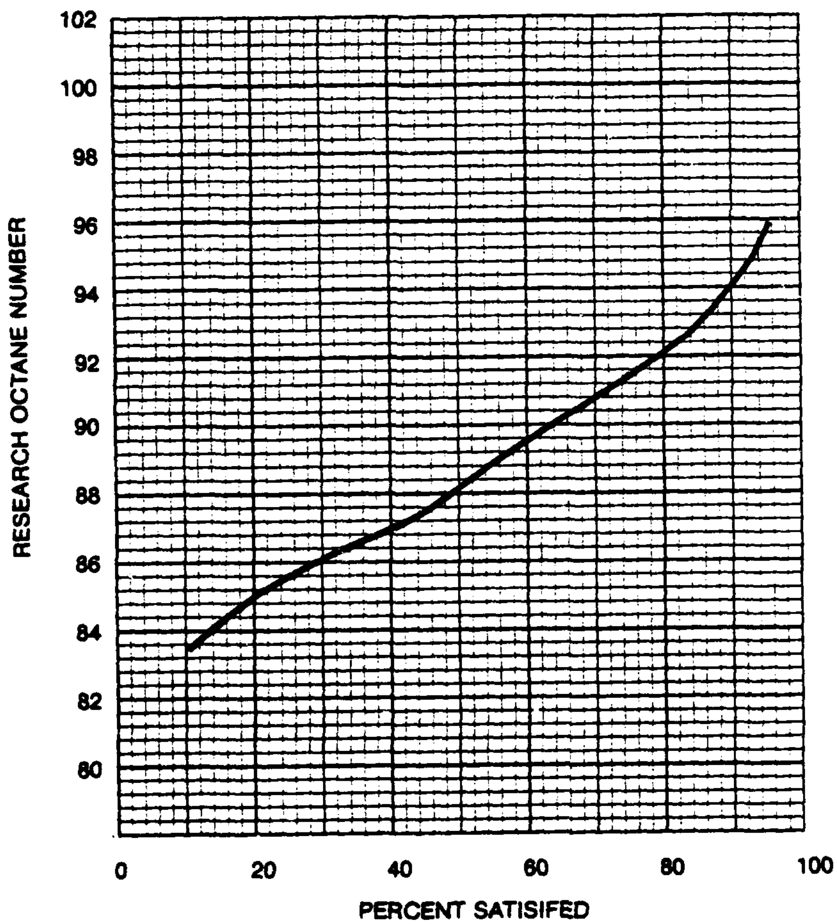


FIGURE 11a

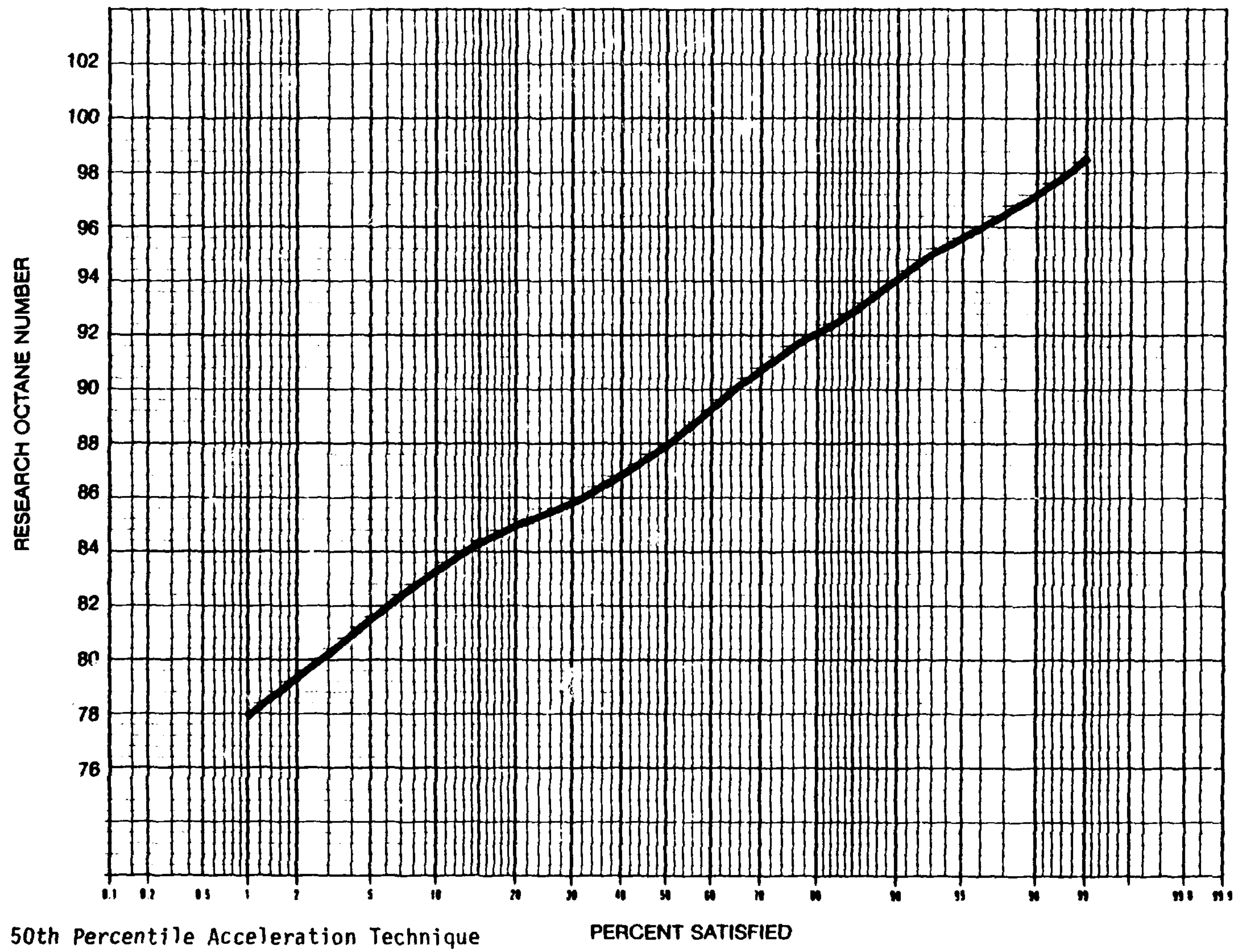
DISTRIBUTION OF 50TH PERCENTILE FBRU *
RON REQUIREMENTS
1981 U.S. AND IMPORTED VEHICLES
(414 VEHICLES)



* 50th Percentile Acceleration Technique

FIGURE 11b

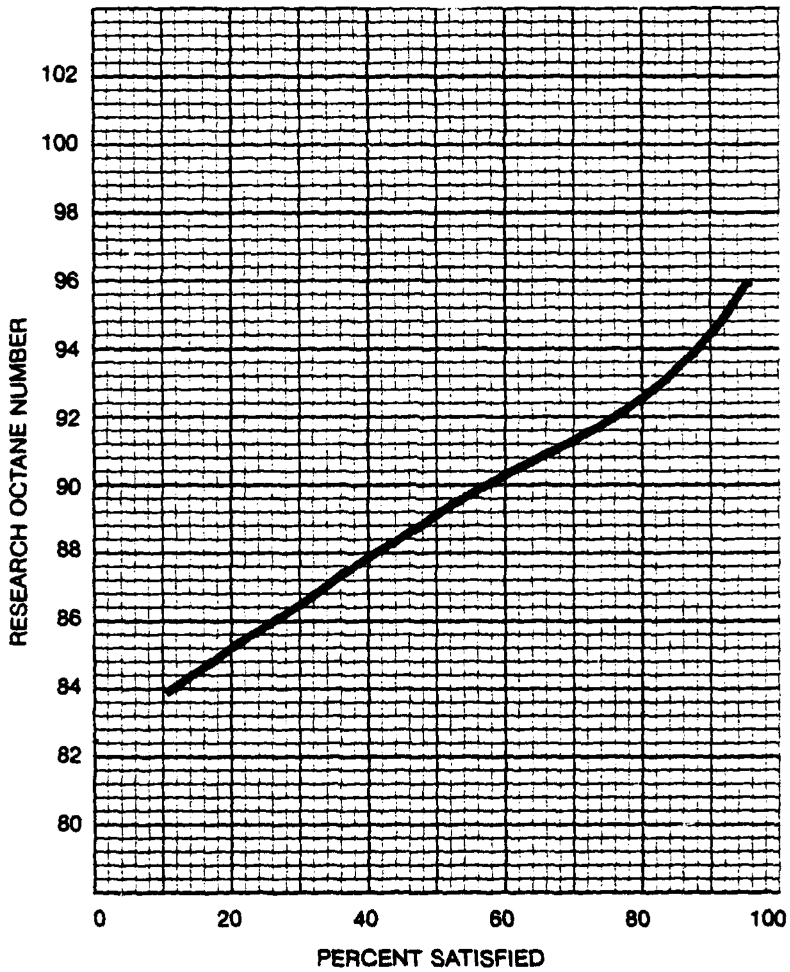
DISTRIBUTION OF
*50TH PERCENTILE FBRU RON REQUIREMENTS
1981 U.S. AND IMPORTED VEHICLES
(414 VEHICLES)



* 50th Percentile Acceleration Technique

FIGURE 12a

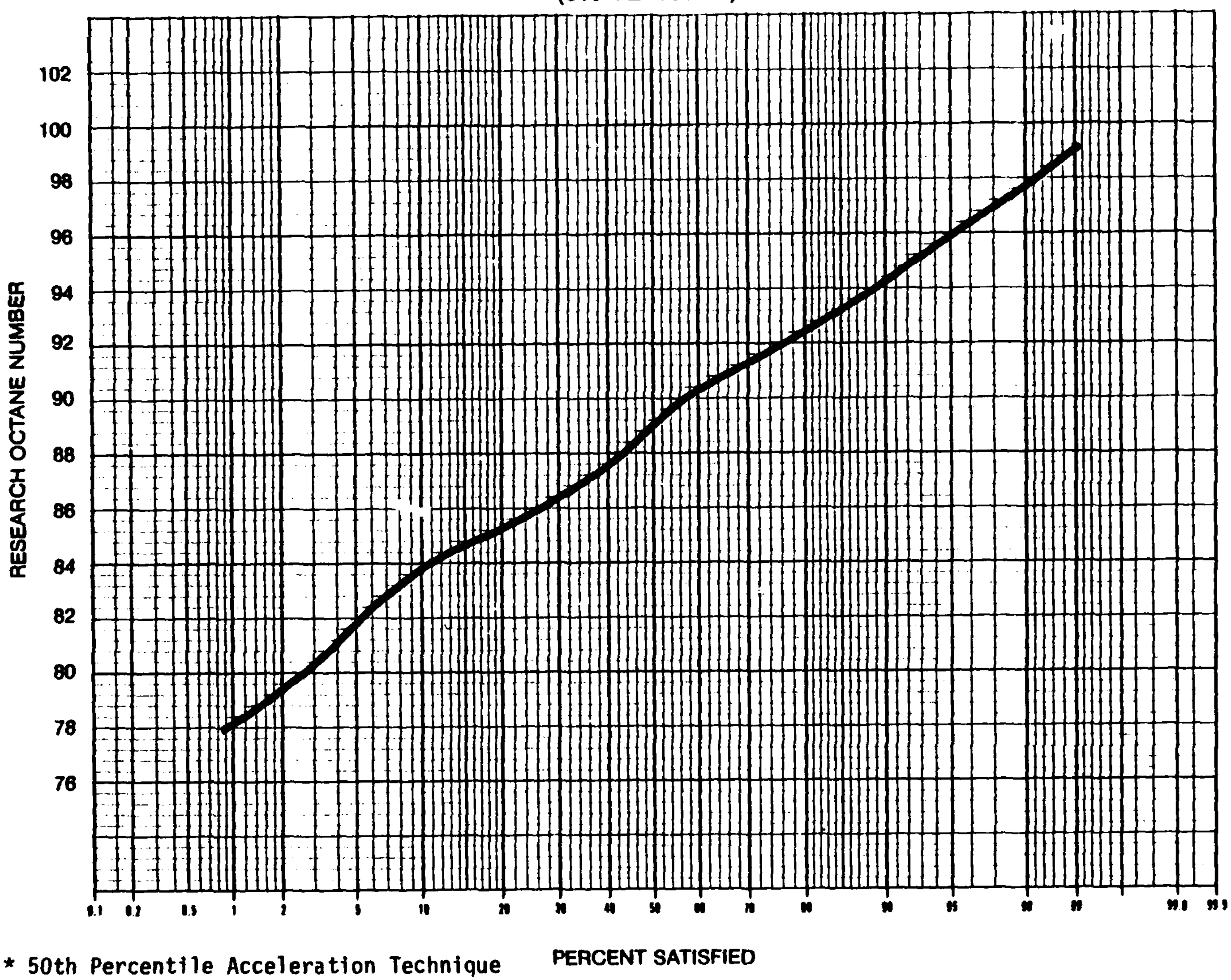
DISTRIBUTION OF 50TH PERCENTILE FBRU*
RON REQUIREMENTS
1981 U.S. VEHICLES
(316 VEHICLES)



* 50th Percentile Acceleration Technique

FIGURE 12b

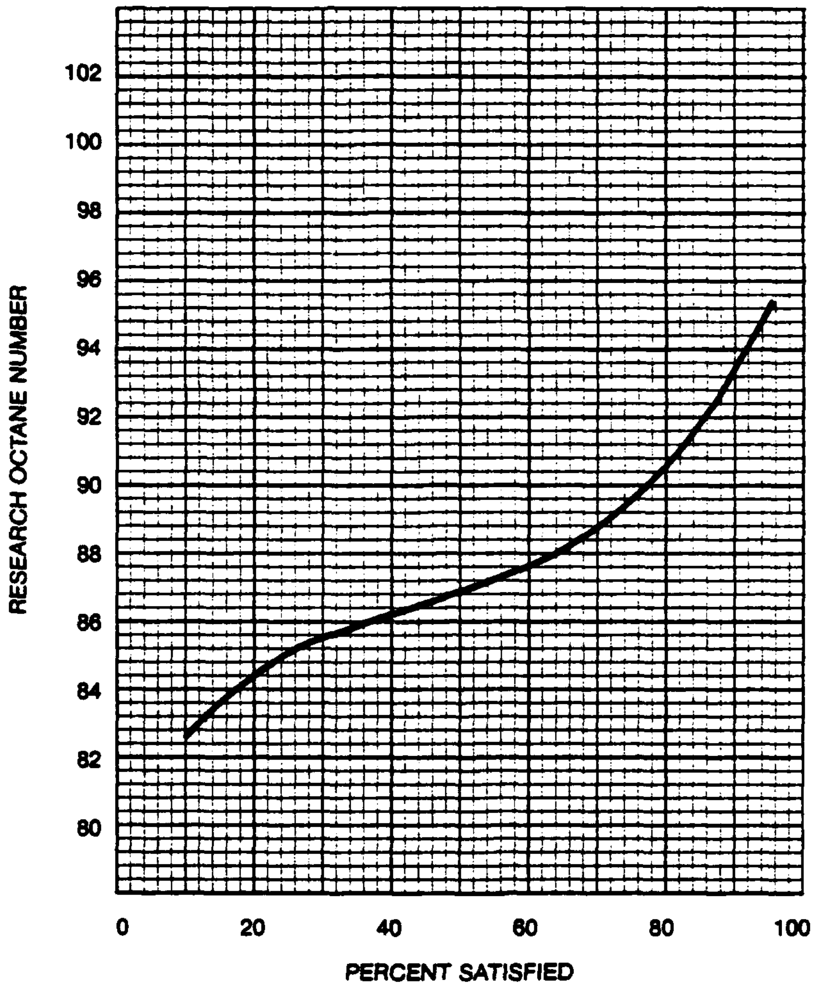
DISTRIBUTION OF
* 50TH PERCENTILE FBRU RON REQUIREMENTS
1981 U.S. VEHICLES
(316 VEHICLES)



* 50th Percentile Acceleration Technique

FIGURE 13a

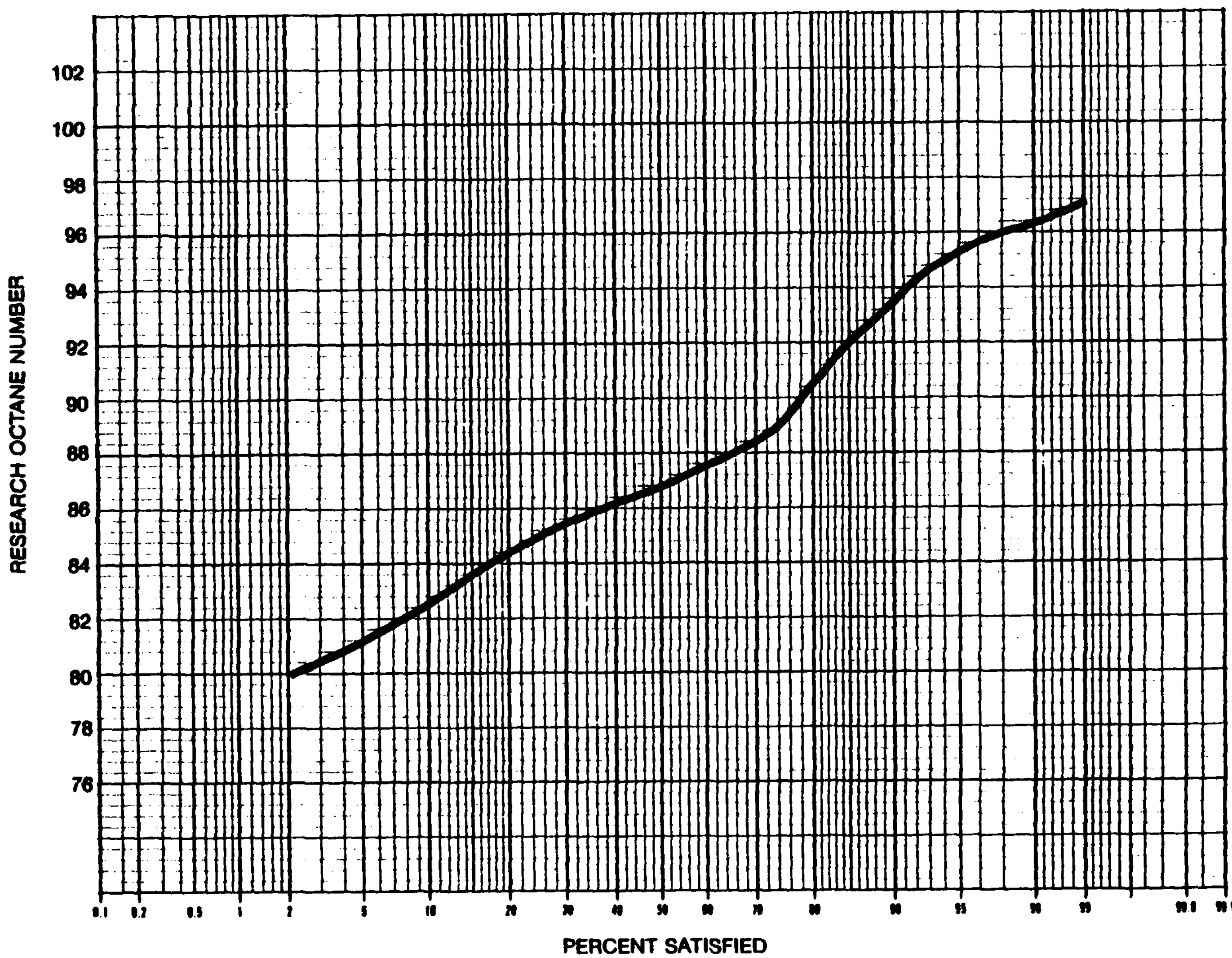
DISTRIBUTION OF 50TH PERCENTILE FBRU *
RON REQUIREMENTS
1981 IMPORTED VEHICLES
(98 VEHICLES)



* 50th Percentile Acceleration Technique

FIGURE 13b

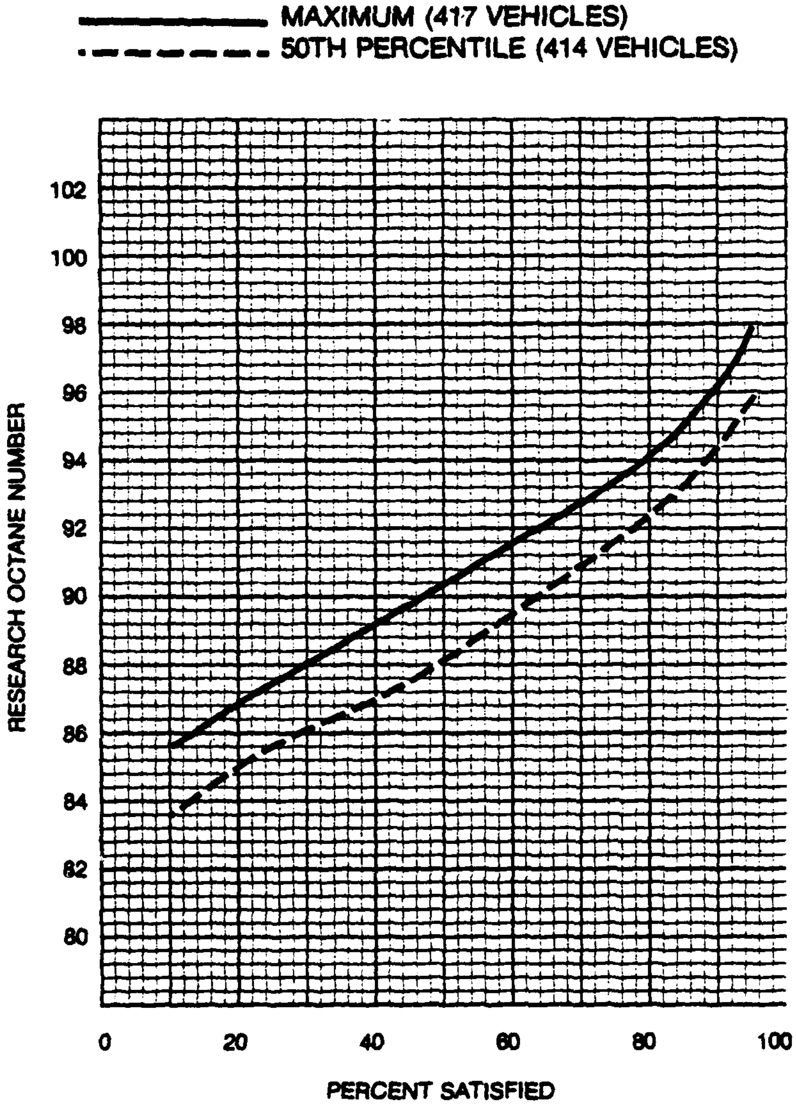
DISTRIBUTION OF
*50TH PERCENTILE FBRU RON REQUIREMENTS
1981 IMPORTED VEHICLES
(98 VEHICLES)



* 50th Percentile Acceleration Technique

FIGURE 14

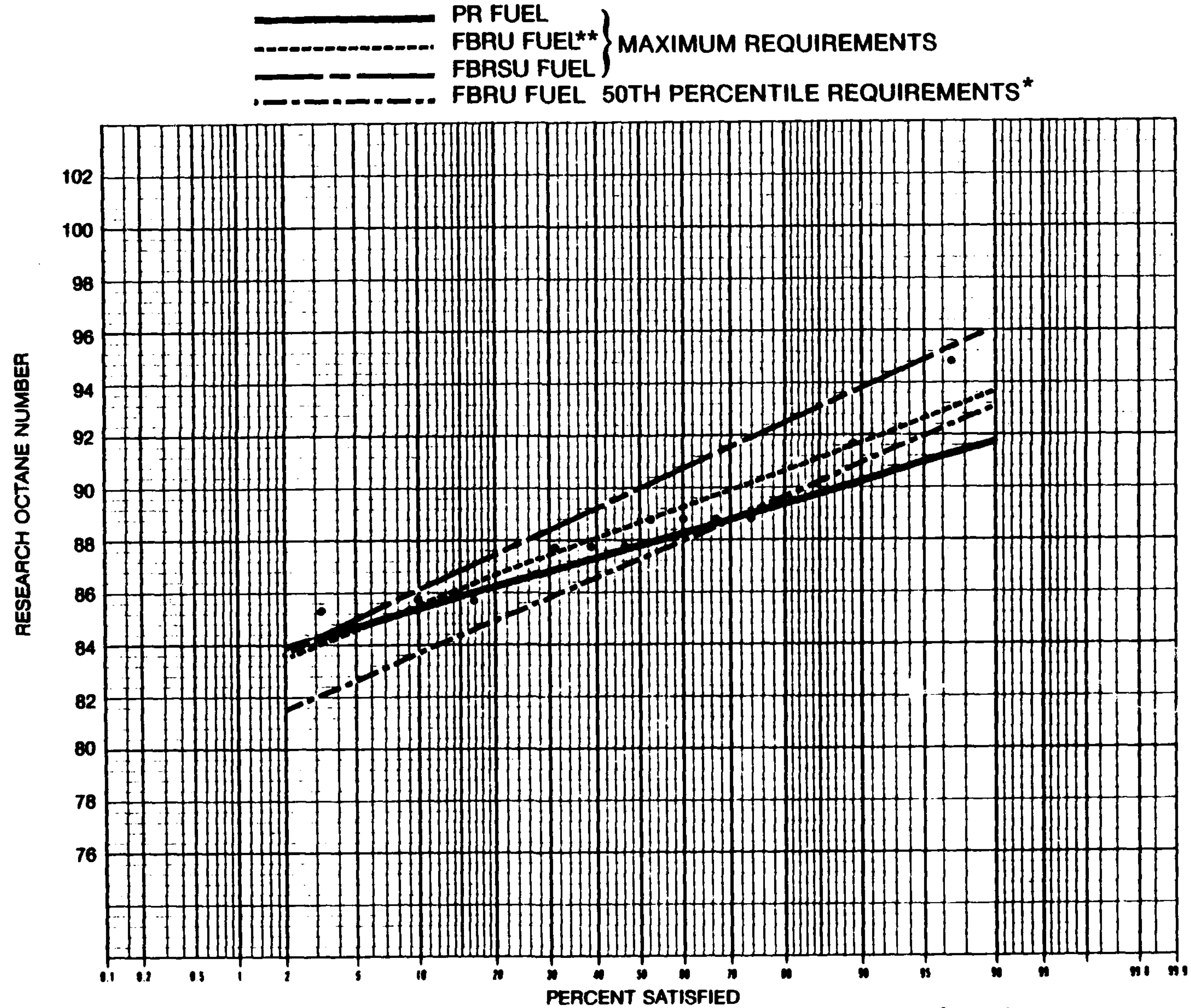
COMPARISON OF MAXIMUM FBRU RON REQUIREMENTS
WITH 50TH PERCENTILE REQUIREMENTS *
1981 U.S. AND IMPORTED VEHICLES



* 50th Percentile Acceleration Technique

FIGURE 15

DISTRIBUTION OF RESEARCH OCTANE NUMBER REQUIREMENTS
1981 MODEL HIA 238 (14 CARS)

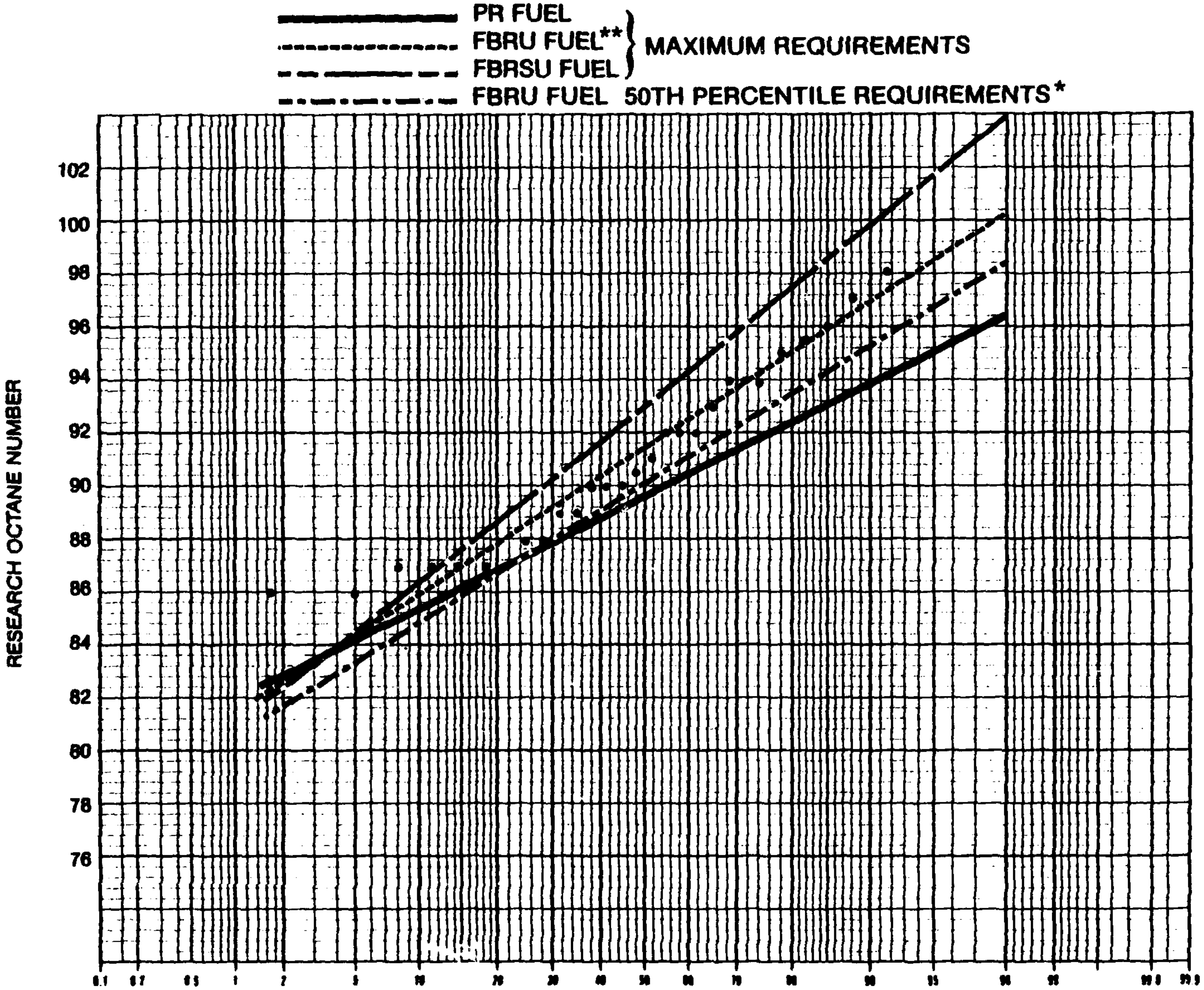


* 50th Percentile Acceleration Technique

** Points Plotted

FIGURE 16

DISTRIBUTION OF RESEARCH OCTANE NUMBER REQUIREMENTS
1981 MODEL IIA 238/LIA 238 (30 CARS)



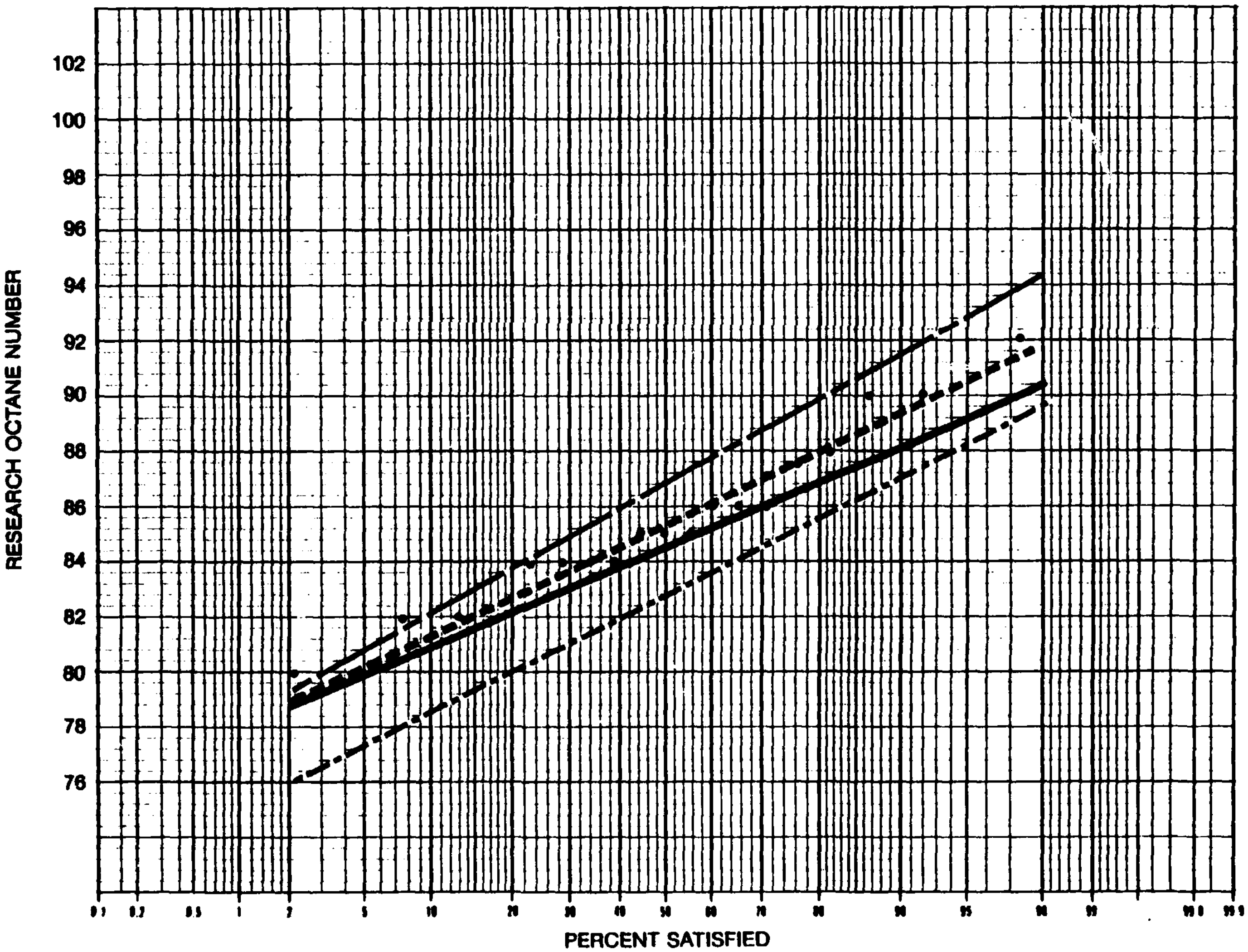
* 50th Percentile Acceleration Technique

** Points Plotted

FIGURE 17

DISTRIBUTION OF RESEARCH OCTANE NUMBER REQUIREMENTS
1981 MODEL NCX 228/HCX 228/ICX 228/LCX 228 (19 CARS)

PR FUEL
FBRU FUEL** MAXIMUM REQUIREMENTS
FBRSU FUEL
FBRU FUEL 50TH PERCENTILE REQUIREMENTS*

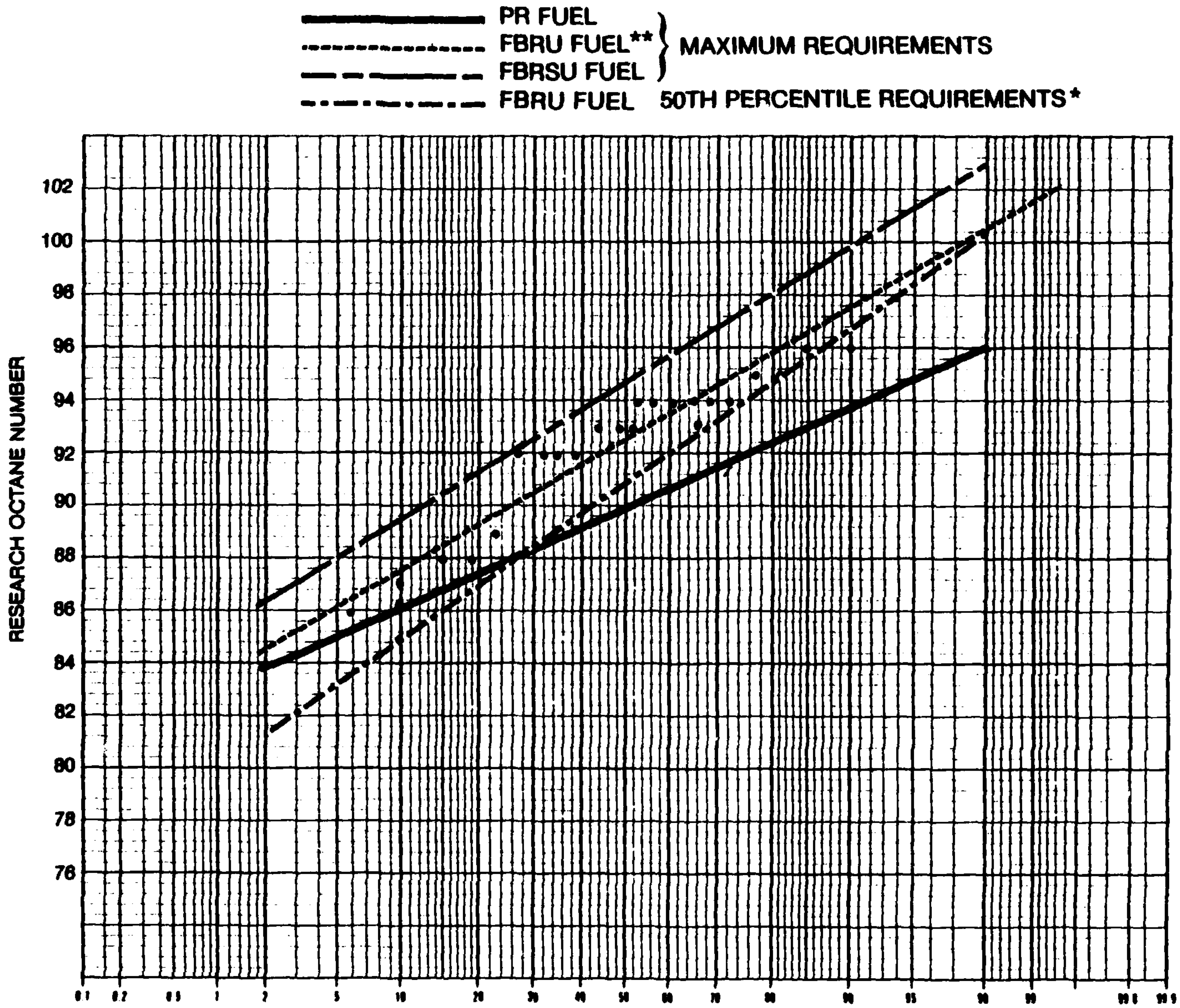


* 50th Percentile Acceleration Technique

** Points Plotted

FIGURE 18

DISTRIBUTION OF RESEARCH OCTANE NUMBER REQUIREMENTS
1981 MODEL NC5 225/HC5 225/IC5 225/LC5 225 (24 CARS)

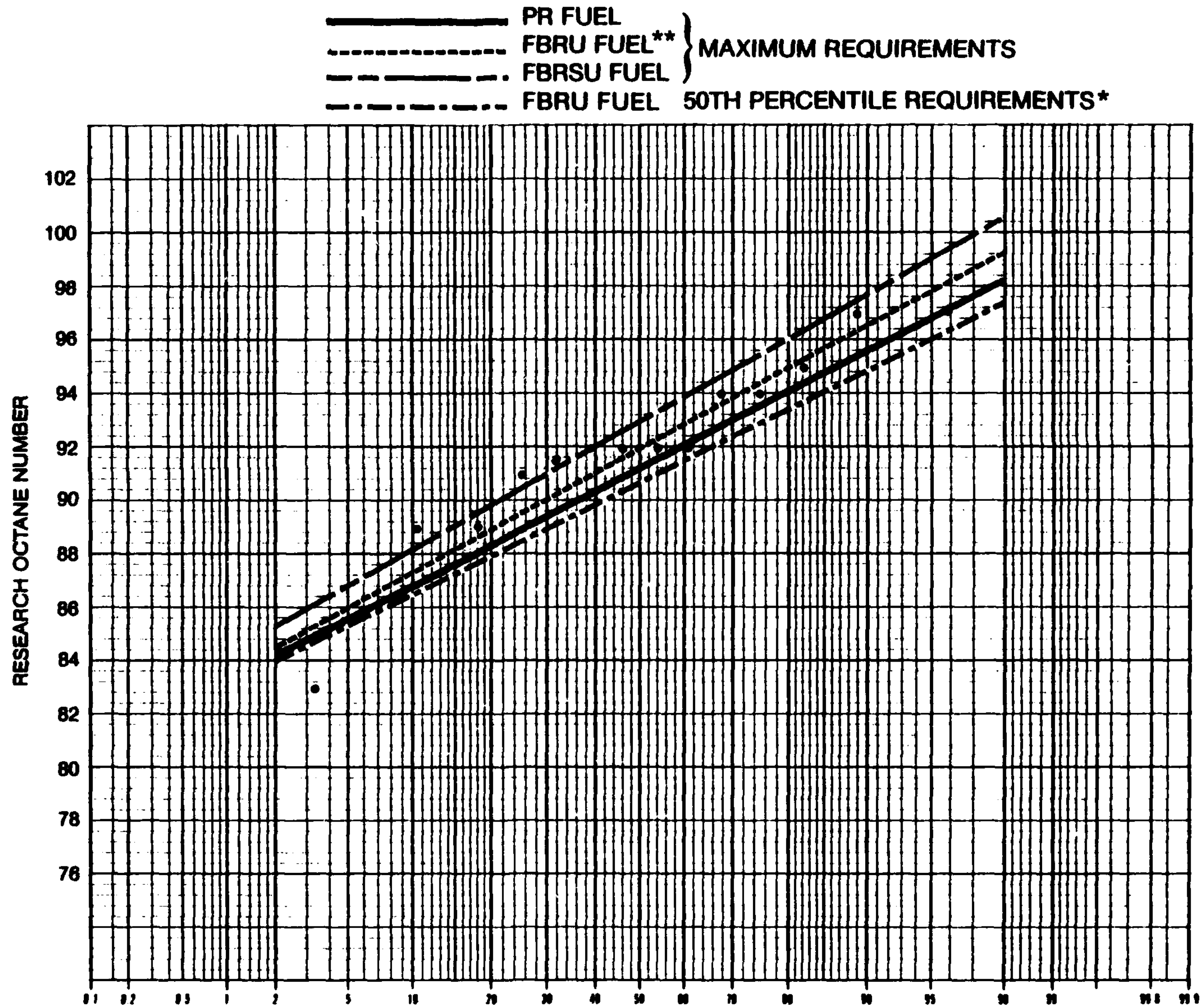


* 50th Percentile Acceleration Technique

** Points Plotted

FIGURE 19

DISTRIBUTION OF RESEARCH OCTANE NUMBER REQUIREMENTS
1981 MODEL OL 216/ML 216 (14 CARS)

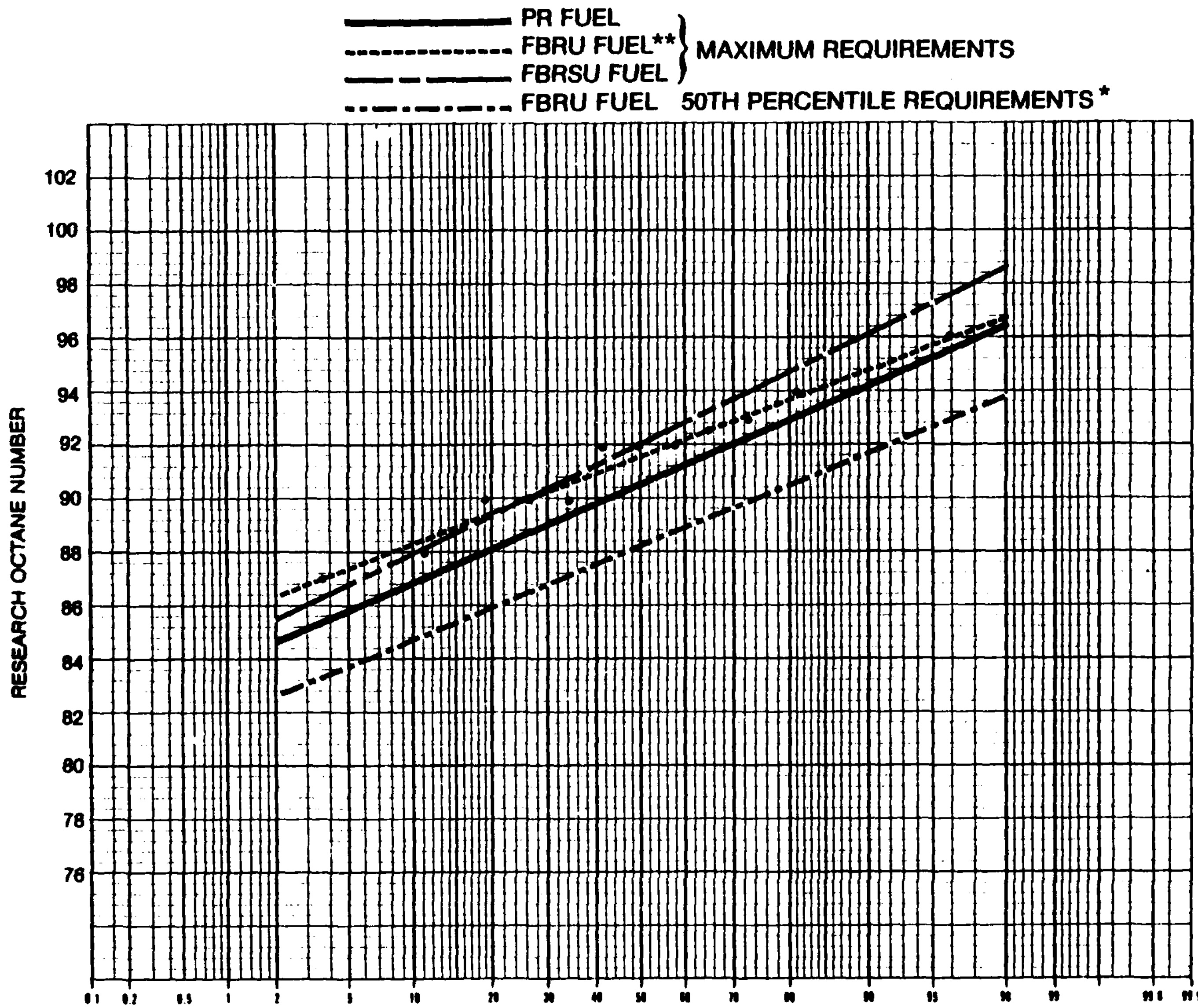


* 50th Percentile Acceleration Technique

** Points Plotted

FIGURE 20

DISTRIBUTION OF RESEARCH OCTANE NUMBER REQUIREMENTS
1981 MODEL OL 216M/ML 216M (13 CARS)

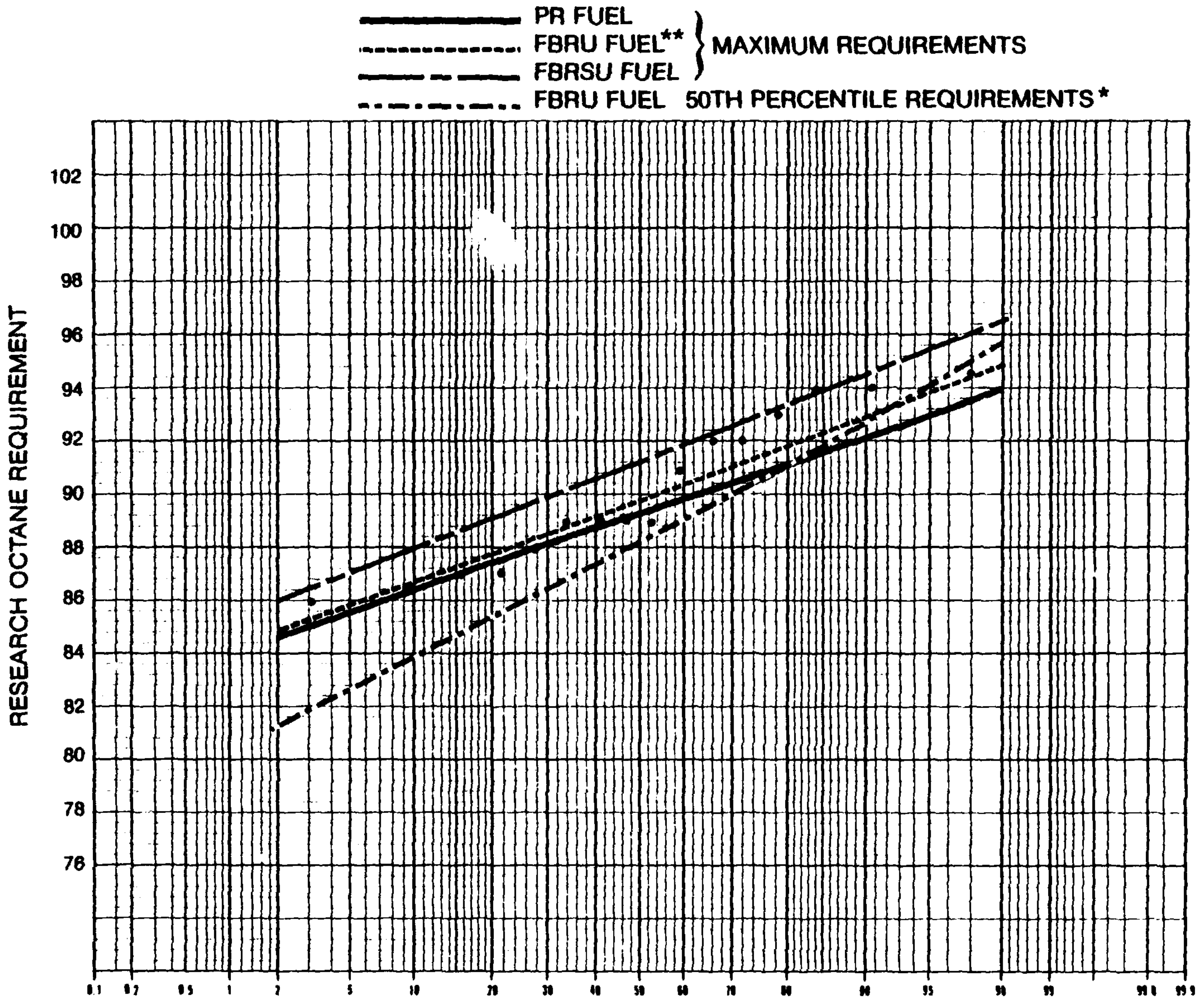


* 50th Percentile Acceleration Technique

** Points Plotted

FIGURE 21

DISTRIBUTION OF RESEARCH OCTANE NUMBER REQUIREMENTS
1981 MODEL OCA 223/MCA 223 (16 CARS)

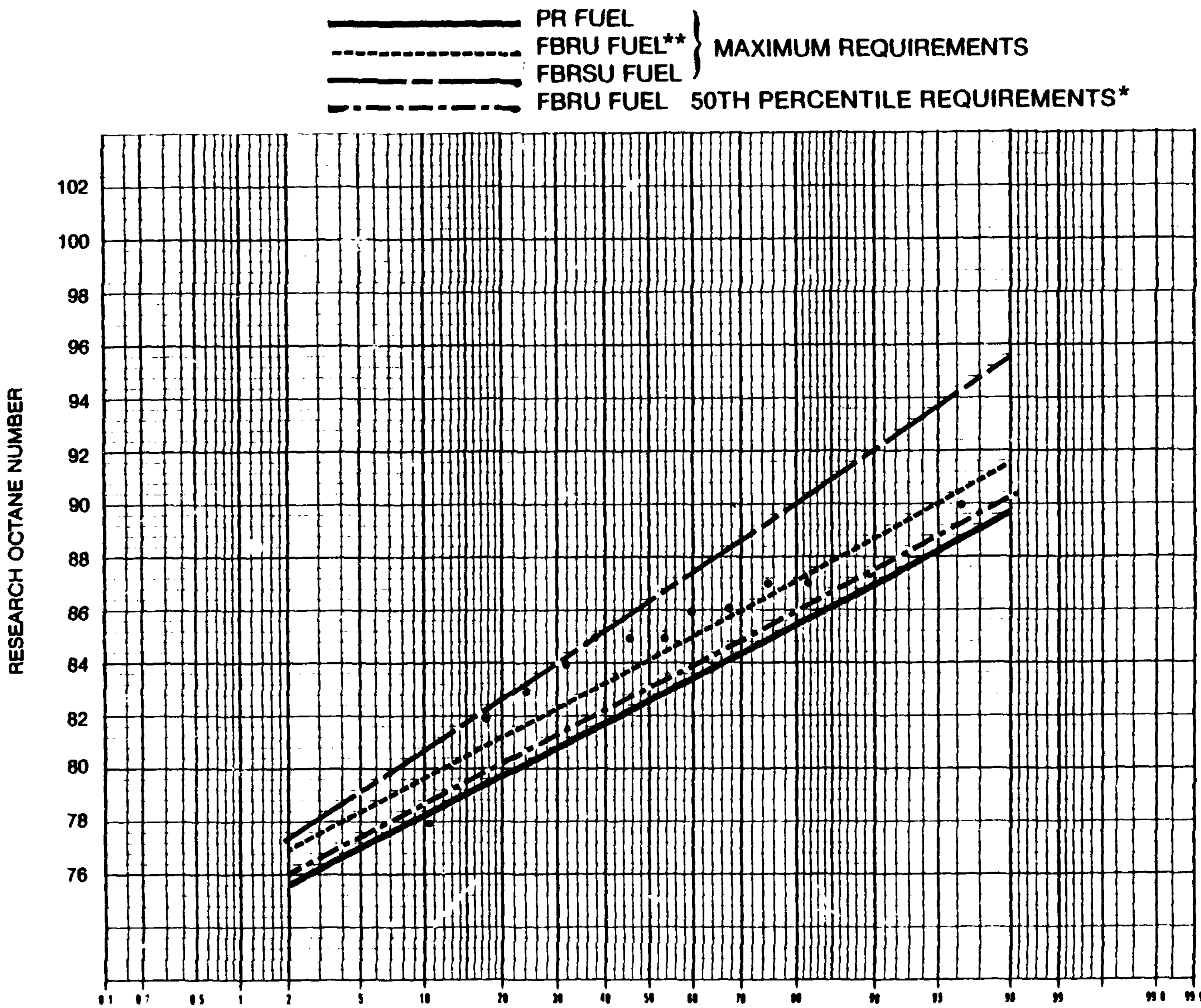


* 50th Percentile Acceleration Technique

** Points Plotted

FIGURE 22

DISTRIBUTION OF RESEARCH OCTANE NUMBER REQUIREMENTS
1981 MODEL PL 217/KL 217 (14 CARS)



* 50th Percentile Acceleration Technique

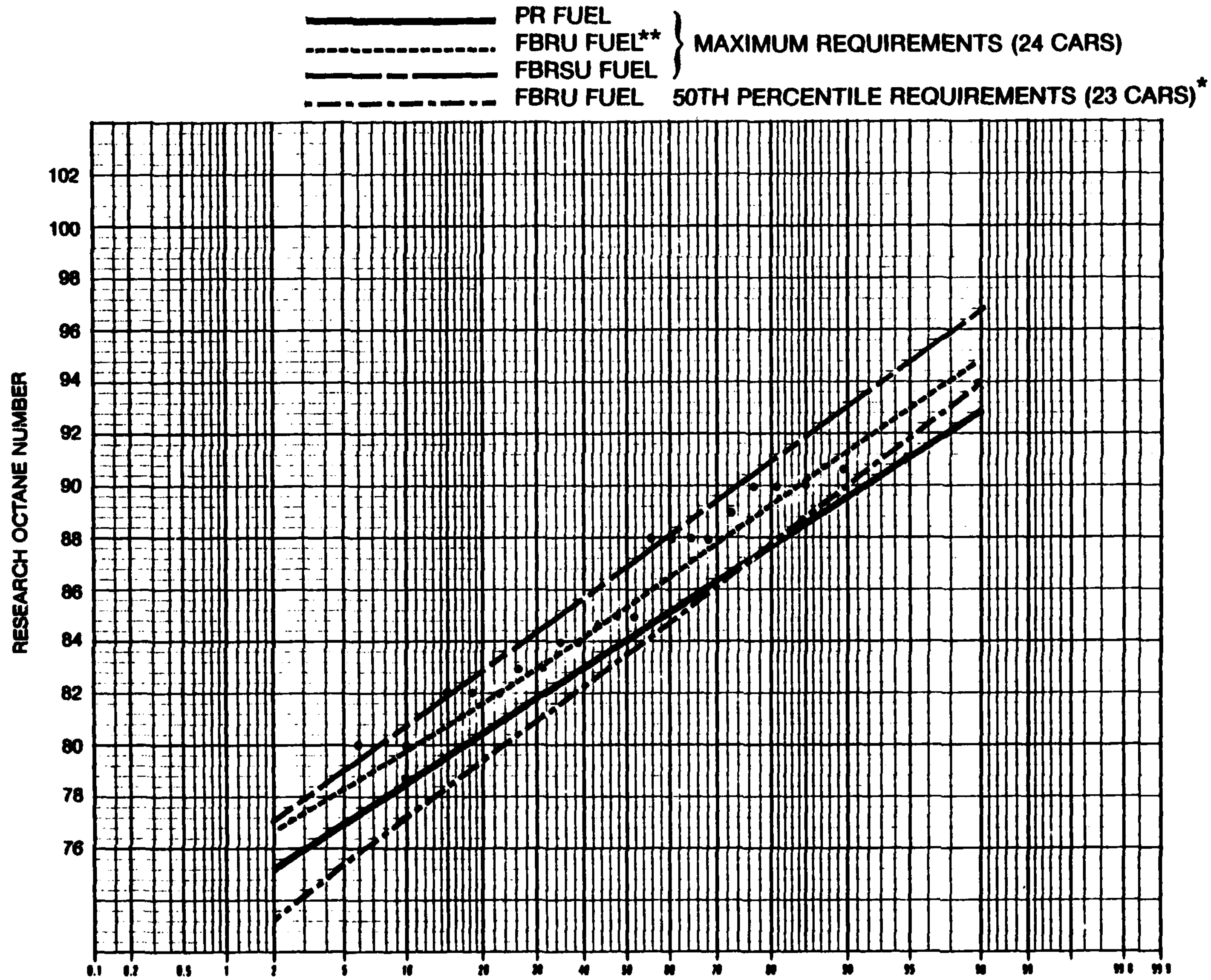
** Points Plotted

AD-A119 513 COORDINATING RESEARCH COUNCIL INC ATLANTA GA F/G 21/4
1981 CRC OCTANE NUMBER REQUIREMENT SURVEY.(U)
AUG 82
UNCLASSIFIED CRC-525 DAAK70-81-C-0128
NL

2 3

FIGURE 23

DISTRIBUTION OF RESEARCH OCTANE NUMBER REQUIREMENTS
1981 MODEL PC 222/KC 222 (24 CARS)

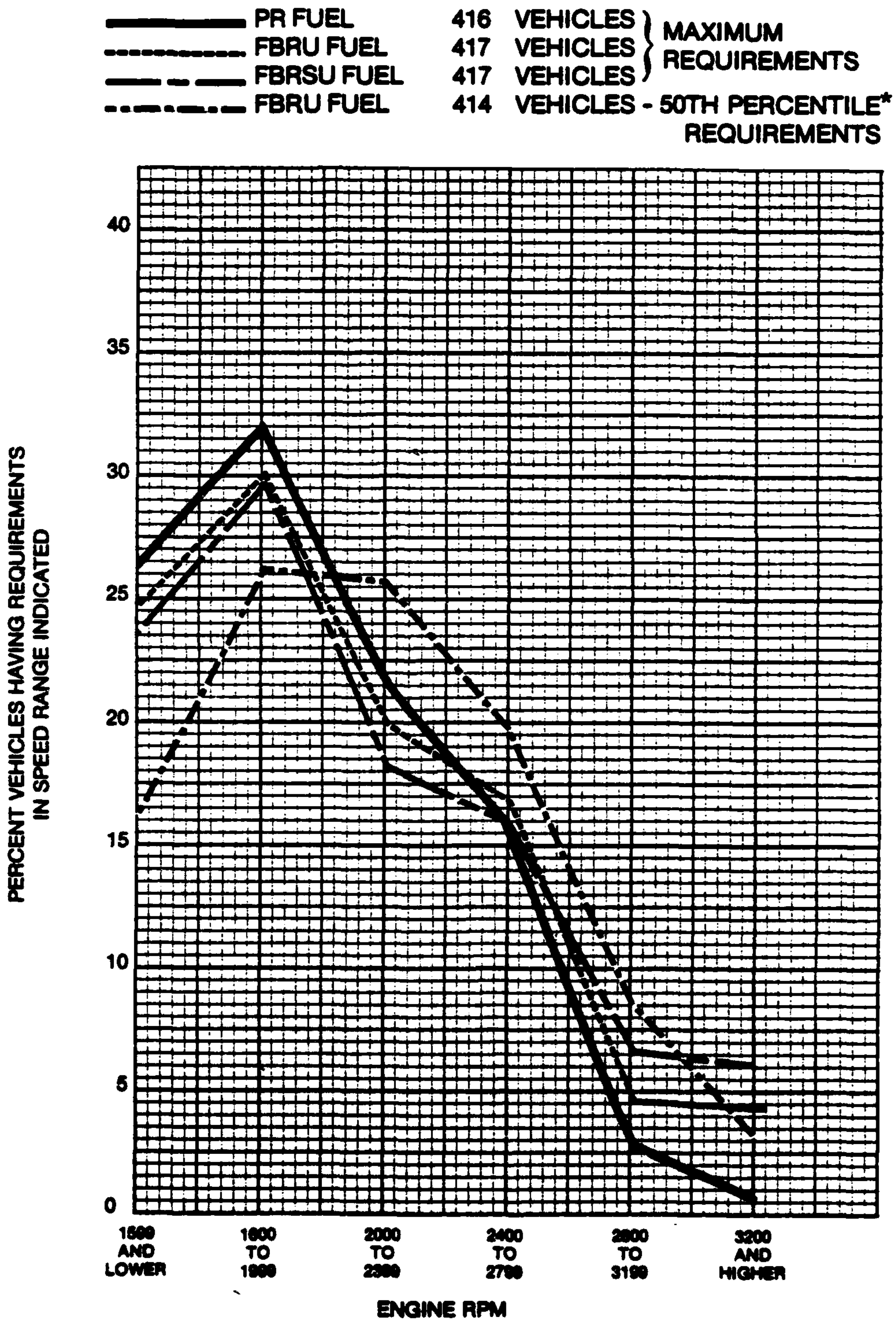


* 50th Percentile Acceleration Technique

** Points Plotted

FIGURE 24

ENGINE SPEEDS FOR MAXIMUM AND 50TH PERCENTILE*
OCTANE NUMBER REQUIREMENTS
ALL 1981 VEHICLES



* 50th Percentile Acceleration Technique

APPENDIX A

PARTICIPATING LABORATORIES

PARTICIPATING LABORATORIES

EASTERN AREA

E. I. du Pont de Nemours and Company, Inc.
Wilmington, Delaware

Exxon Research and Engineering Company
Linden, New Jersey

Gulf Research and Development Company
Pittsburgh, Pennsylvania

Mobil Research and Development Corporation
Paulsboro, New Jersey

Sun Company
Marcus Hook, Pennsylvania

Texaco Inc.
Beacon, New York

EAST CENTRAL AREA

Ethyl Corporation
Detroit, Michigan

Ford Motor Company
Dearborn, Michigan

General Motors Corporation
Warren, Michigan

Shell Canada
Oakville, Ontario

Standard Oil Company (Ohio)
Cleveland, Ohio

WESTERN AREA

Chevron Research Company
Richmond, California

Union Oil Company of California
Brea, California

WEST CENTRAL

Amoco Oil Company
Naperville, Illinois

Phillips Petroleum Company
Bartlesville, Oklahoma

Shell Development Company
Houston, Texas

APPENDIX B

MEMBERSHIP: 1981 ANALYSIS PANEL

1981 CRC OCTANE NUMBER REQUIREMENT SURVEY

(CRC Project No. CM-123-81)

1981 Analysis Panel

D. P. Barnard, Leader	Standard Oil Company (Ohio)
J. L. Borzone	Mobil Research and Development Corporation
W. J. Brown	Ethyl Corporation
E. S. Corner	Consultant
N. D. Esau	Amoco Oil Company
D. W. Hall	Chevron Research Company
J. D. Rogers, Jr.	E. I. du Pont de Nemours and Company, Inc.
K. R. Schaper	Gulf Research and Development Company
R. A. Wirth	Sun Company
T. Wusz	Union Oil Company of California

APPENDIX C

DATA ON 1981 FULL-BOILING RANGE REFERENCE FUELS

TABLE C-I

SUPPLIERS' FUEL INSPECTIONS

COMPARISON OF 1980 AND 1981 FBRU FUELS

	Low-Octane Base Blend		Intermediate-Octane Base Blend		High-Octane Base Blend	
	RMFD 332-81	RMFD 326-80	RMFD 333-81	RMFD 327-80	RMFD 334-81	RMFD 328-80
Laboratory Inspection						
Distillation, °F						
IBP	97	106	97	106	91	114
10% Evap.	130	138	126	138	124	156
30% Evap.	160	182	167	164	173	198
50% Evap.	197	219	204	202	225	238
70% Evap.	235	243	232	256	247	257
90% Evap.	308	318	285	344	285	296
End Point	383	404	377	436	347	360
Gravity, °API	66.9	66.6	62.2	60.6	53.1	51.2
RVP, psi	8.4	8.0	9.0	7.1	9.0	6.9
Lead, g/gal.	<0.003	0.009	<0.003	0.015	<0.003	0.013
Oxidation Stability, hr.	>24	>24	>24	>24	>24	>24
Hydrocarbon Type, Vol. %						
Aromatics	18.0	12.7	18.0	18.2	47.0	50.8
Olefins	5.0	10.6	8.0	11.1	0.0	1.6
Saturates	77.0	76.7	74.0	70.7	53.0	47.6
Research Octane Number	77.4	77.1	90.7	89.9	100.4	100.9
Motor Octane Number	73.6	73.1	82.9	82.1	89.1	90.0
Sensitivity	3.8	4.0	7.8	7.8	11.3	10.9

TABLE C-II

OCTANE NUMBERS AND COMPOSITIONS FOR 1981 FBRU FUELS

Research Octane No.	Blending Data Composition, Volume Percent			Motor Octane No.	Sensi-tivity
	RMFD-332-81	RMFD-333-81	RMFD-334-81		
78	97.0	3.0	-	74.3	3.7
80	82.5	17.5	-	76.1	3.9
82	67.0	33.0	-	77.8	4.2
84	52.0	48.0	-	79.2	4.8
85	44.0	56.0	-	79.8	5.2
86	36.0	64.0	-	80.4	5.6
87	28.0	72.0	-	81.0	6.0
88	20.0	80.0	-	81.6	6.4
89	12.0	88.0	-	82.1	6.9
90	4.0	96.0	-	82.7	7.3
91	-	95.0	5.0	83.2	7.8
92	-	85.0	15.0	83.7	8.3
93	-	75.0	25.0	84.3	8.7
94	-	65.0	35.0	84.9	9.1
95	-	55.0	45.0	85.5	9.5
96	-	45.0	55.0	86.0	10.0
97	-	34.0	66.0	86.7	10.3
98	-	24.0	76.0	87.4	10.6
99	-	15.0	85.0	88.1	10.9
100	-	3.0	97.0	88.8	11.2

TABLE C-III

SENSITIVITIES OF 1980 AND 1981 FBRU AND FBRSU FUELS

Research Octane No.	FBRU 1981	FBRU 1980	FBRU Δ	FBRSU 1981	FBRSU 1980	FBRSU Δ
78	3.7	3.5	0.2	5.8	5.5	0.3
80	3.9	4.1	-0.2	6.4	5.9	0.5
82	4.2	4.5	-0.3	6.9	6.4	0.5
84	4.8	5.1	-0.3	7.5	7.0	0.5
85	5.2	5.3	-0.1	7.7	7.3	0.4
86	5.6	5.6	0.0	8.0	7.6	0.4
87	6.0	6.0	0.0	8.3	8.0	0.3
88	6.4	6.3	0.1	8.6	8.4	0.2
89	6.9	6.7	0.2	8.9	8.9	0.0
90	7.3	7.0	0.3	9.2	9.4	-0.2
91	7.8	7.4	0.4	9.6	9.8	-0.2
92	8.3	7.8	0.5	9.9	10.2	-0.3
93	8.7	8.2	0.5	10.2	10.6	-0.4
94	9.1	8.5	0.6	10.6	11.0	-0.4
95	9.5	8.9	0.6	10.9	11.5	-0.4
96	10.0	9.3	0.7	11.2	11.9	-0.7
97	10.3	9.7	0.6	11.5	12.3	-0.8
98	10.6	9.9	0.7	11.8	12.6	-0.8
99	10.9	10.2	0.7	12.1	12.7	-0.6
100	11.2	10.4	0.8	12.4	12.7	-0.3
101	-	(10.4)	-	12.7	(12.6)	0.1

TABLE C-IV

SUPPLIERS' FUEL INSPECTIONS

COMPARISON OF 1980 AND 1981 FB[illegible] FUELS

	Low-Octane Base Blend		Inte[illegible]iate O[illegible] Bas[illegible]d		High-Octane Base Blend	
	RMFD 335-81	RMFD 329-80	RMFD 336-81	RMFD 330-80	RMFD 337-81	RMFD 331-80
Laboratory Inspection						
Distillation, °F						
IBP	101	100	99	90	103	104
10% Evap.	134	146	134	124	131	152
30% Evap.	174	203	170	159	179	204
50% Evap.	217	262	202	214	232	240
70% Evap.	266	308	237	248	268	257
90% Evap.	354	388	320	353	315	294
End Point	412	420	406	430	390	398
Gravity, °API	62.8	53.1	58.1	63.5	53.5	46.2
RVP, psi	7.3	9.3	7.6	9.0	8.2	6.9
Lead, g/gal.	<0.003	0.009	<0.003	0.017	<0.003	0.014
Oxidation Stab., hr.	>24	>24	>24	>24	>24	>24
Hydrocarbon Type, Vol. %						
Aromatics	16.0	36.0	25.0	23.8	43.0	59.8
Olefins	33.0	18.2	10.0	26.5	5.0	12.4
Saturates	51.0	45.8	65.0	49.7	52.0	27.8
Research Octane Number	77.8	77.3	90.7	90.8	101.5	100.6
Motor Octane Number	71.4	71.2	80.8	80.9	88.4	87.7
Sensitivity	6.4	6.1	9.9	9.9	13.1	12.9

TABLE C-V

OCTANE NUMBERS AND COMPOSITIONS FOR 1981 FBRSU FUELS

Research Octane No.	Blending Data Composition, Volume Percent RMFD-335-81	RMFD-336-81	RMFD-337-81	Motor Octane No.	Sensi-tivity
78	96.0	4.0	-	72.2	5.8
80	81.0	19.0	-	73.6	6.4
82	66.0	34.0	-	75.1	6.9
84	51.0	49.0	-	76.5	7.5
85	43.0	57.0	-	77.3	7.7
86	35.5	64.5	-	78.0	8.0
87	27.5	72.5	-	78.7	8.3
88	20.0	80.0	-	79.4	8.6
89	12.0	88.0	-	80.1	8.9
90	4.0	96.0	-	80.8	9.2
91	-	96.0	4.0	81.4	9.6
92	-	87.5	12.5	82.1	9.9
93	-	79.0	21.0	82.8	10.2
94	-	70.0	30.0	83.4	10.6
95	-	61.0	39.0	84.1	10.9
96	-	52.0	48.0	84.8	11.2
97	-	42.5	57.5	85.5	11.5
98	-	33.0	67.0	86.2	11.8
99	-	22.5	77.5	86.9	12.1
100	-	10.0	90.0	87.6	12.4
101	-	-	100.0	88.3	12.7

APPENDIX D

PROGRAM

APPENDIX D

COORDINATING RESEARCH COUNCIL
INCORPORATED
219 PERIMETER CENTER PARKWAY
ATLANTA, GEORGIA 30346
(404) 396-3400

PROGRAM

for the

1981 CRC OCTANE NUMBER REQUIREMENT SURVEY

CRC Project No. CM-123-81

Revised

September 1980

TABLE OF CONTENTS

I. INTRODUCTION

The 1981 program of the CRC Light-Duty Octane Number Requirement Survey Group will consist of a survey of the octane number requirements of 1981 model domestic and imported vehicles. For the purposes of this program, the designation "passenger vehicles" will include passenger cars and light-duty (<8500 lb/3856 kg GVW) pickup trucks, and vans. Approximately 450 vehicles will be tested. Most of these vehicles will be sampled in proportion to their relative production or import volume, to provide data from which to estimate the distribution of octane number requirements for the 1981 model vehicle population in the United States. In addition, select models of special interest will be tested in sufficient numbers to estimate their requirement distributions.

Knocking characteristics will be investigated with three series of reference fuels. Tank fuel knock will also be evaluated. Octane requirements will be established for each vehicle using high sensitivity unleaded full-boiling range reference (FBRSU) fuels, average sensitivity unleaded full-boiling range reference (FBRU) fuels, and primary reference (PR) fuels.

Octane requirements throughout the speed range will be obtained with PR fuels only. After-run characteristics will be observed on tank fuel.

II. GEOGRAPHICAL AREAS

As in previous years, the 1981 Survey will be conducted on a nationwide basis. The country has been divided into four geographical areas. Participants located in New York, New Jersey, Delaware, and Pennsylvania have been included in the Eastern area; those located in Ohio, Michigan, and Kentucky comprise the East Central area; those in Illinois, Texas, and Oklahoma comprise the West Central area; and California participants make up the Western area. A coordinator has been appointed for each area as follows:

Eastern Area	- S. Antika
East Central Area	- D. P. Barnard
West Central Area	- J. B. Baker
Western Area	- T. Wusz

The area coordinators will contact their area participants periodically regarding the progress of the survey. To expedite this, it is suggested that participants send copies of all correspondence concerning the survey to the area coordinators. This program outlines the survey in broad terms. If more detailed information is desired, it is suggested that the participant contact his area coordinator.

III. VEHICLES

A total of approximately 450 vehicles will be tested in the 1981 Survey. By requesting each participating laboratory to test 25 vehicles and assuming 18 participants, the 450-vehicle total is obtained. These will be divided into two groups: (1) the statistical group, sampled in proportion to U. S. car model production or import volume, and (2) select models of special interest. Approximately 20 of each of these select models will be tested to provide an estimate of the octane requirement distribution for each model. Some of these 20 vehicles will be those already included in the statistical group, and the remainder will be additional vehicles added to the program.

The desired number of vehicles to be tested in each category is as follows:

Statistical Group	400
Additional Select Model Group	50
Total	450

A detailed breakdown of the specific models and the number of each model to be tested will be circulated to the participants in May 1981 after an estimate of vehicle model production has been obtained. Design specifications for select models to be tested in the 1981 Survey are shown on page D-5. Selection of these vehicles has been based on new or modified design characteristics that might have a significant effect on octane number requirements and high sales volume which allows individual treatment without additional testing.

Wherever possible, specific vehicle assignments to individual participating laboratories will be made in a pattern which tends to minimize data bias. This will be accomplished by apportioning cars of a given model among the four geographical areas, and subsequently among the laboratories within each area, in order to minimize the effect of non-random factors on the results of the Survey.

IV. FUELS

A. Full-Boiling Range Reference Fuels

Two full-boiling range reference fuel series will be used to define the vehicle octane number requirements. The two series will be unleaded and of varying sensitivity. One series will be comparable to the average sensitivity of unleaded commercial fuels (FBRU); the other series (FBRSU) will be about two num-

bers higher in sensitivity than the FBRU fuels. The nominal Research Octane Number (RON) range for both fuel series is 77 to 101.

The two series will be blended in increments of two RON up to 84 and one RON above 84 from three base fuels for each series. The base fuels are compounded from normal refinery gasoline components. Limiting specifications for each base fuel for both series are shown in Table D-II.

Research and Motor ratings will be determined for incremental blends of each fuel series by all participants to provide data for establishment of blending curves. The average ratings and blending curves will be circulated to all participants.

B. Primary Reference Fuels

Blends of ASTM-grade isooctane and normal heptane will be prepared in two octane number increments from 76 to 82 and one octane number increments from 82 to 100.

C. Tank Gasoline

Research and Motor octane ratings will be obtained only on gasoline samples from the tank of vehicles with owner questionnaire (Attachment 1). Owner's questionnaire should be deleted when:

a) the vehicle does not have a regular driver;
b) the ignition timing had to be reset.

V. TEST TECHNIQUE

All tests are to be conducted using the technique entitled, "Technique for Determination of Octane Number Requirements of Light-Duty Vehicles" (CRC Designation E-15-81). A copy of this technique is included as Attachment 2 to this program. Octane number requirement investigations are to be conducted in all vehicles under level road conditions. Any vehicle obviously in poor mechanical condition or with malfunctioning emission control devices should not be considered for test work. The vehicles must have a minimum of 6000 deposit miles (9656 km) and preferably be privately owned and operated. Vehicles previously used for fuel road octane rating must not be employed in this Survey.

Data should be reported on each vehicle tested, even though knock was not encountered on any of the fuels.

The order in which the fuels are to be tested is as follows:

1) Tank fuel; 2) FBRSU; 3) FBRU; 4) PR.

VI. DATA FORMS

The test results on each vehicle will be reported on data form DFMF-11-1181 and work form DFMF-12-1181. Copies of these forms will be mailed to all participants from the CRC office with instructions for their use printed on the forms. Additional instructions are included in each test technique.

VII. REPORTING RESULTS

A consolidated data report form DFMF-15-1181 and speed range summary form DFMF-25-1181 will also be provided by CRC. The consolidated report forms and standard data forms for each vehicle tested should be submitted to the Coordinating Research Council, Inc., 219 Perimeter Center Parkway, Atlanta, Georgia 30346, as soon as possible, but not later than October 31, 1981.

TABLE D-I

DESIGN SPECIFICATIONS FOR 1981 SELECT MODELS

Make & Model	Engine Displ. Litres	No. Cyl	Carb Bbls	Comp. Ratio	BHP	Trans Type	No. Stat.	Addl Select	Total
Citation/Phoenix/ Skylark/Omega	2.5	L-4	CLAF 2	8.2	67	A	16	4	20
Citation/Phoenix/ Skylark/Omega	2.8	V-6	CLAF 2	8.5	86	A	16	4	20
Cutlass/Regal	3.8	V-6	CLAF 2	8.0	82	A	9	11	20
Fairmont/Zephyr/ Mustang/Capri	2.3	L-4	CLAF 2	9.0	66	A	5	15	20
Lynx/Escort	1.6	L-4	CLAF 2	8.8	NA	A	4	16	20
Omni/Horizon	1.7	L-4	CLAF 2	8.2	63	A	6	14	20
Aries/Reliant	2.2	L-4	CLAF 2	8.9	84	A	7	13	20
Toyota Corolla	1.8	L-4	CLAF 2	9.0	56	A	6	14	20

TABLE D-II

LIMITING SPECIFICATIONS FOR 1981 FULL-BOILING RANGE REFERENCE FUELS*

Inspection Tests	Unleaded Average Sensitivity Reference Fuels (FBRU) RMFD 332		RMFD 333	RMFD 334	Unleaded High Sensitivity Reference Fuel (FBRSU) RMFD 335	RMFD 336	RMFD 337
ASTM Distillation, °F(°C)							
IBP	90	(32.2)	90	90	90	90	90
10% Evap.	115-158	(46.1-70.0)	115-158	115-158	115-158	115-158	115-158
30% Evap.	150-190	(65.6-87.8)	150-190	150-190	150-190	150-190	150-190
50% Evap.	195-250	(90.6-121.1)	195-250	195-250	195-250	195-250	195-250
70% Evap.	230-300	(110.0-148.9)	230-300	230-300	230-300	230-300	230-300
90% Evap.	285-374	(140.6-190.0)	285-374	285-374	285-374	285-374	285-374
End Point, Max.	437	(225)	437	437	437	437	437
RVP, psi (KPa)	7-9	(48-62)	7-9	7-9	7-9	7-9	7-9
Lead, g/gal (g/l)	<0.03	(<0.008)	<0.03	<0.03	<0.03	<0.03	<0.03
Oxidation Stability, minutes, minimum	1440		1440	1440	1440	1440	1440
Hydrocarbon Type, Vol %	To be determined by inspection and reported						
Aromatics**							
Olefins							
Saturates							
Octane Number							
Research	77±1		90±1	101±1	77±1	90±1	101±1
Sensitivity***	4±.5		7.7±.5	11±.5	6.0±.5	9.7±.5	13±.5
Color	Clear		Green	Red	Yellow	Deep Purple	Light Blue

All fuels to contain minimum 5 PTB of a 100% active antioxidant. No manganese added.

* To be compounded from normal refinery components

** 1% maximum Benzene or legal

*** Sensitivites are shown for the mean Research Octane Number.

Minimum of two units sensitivity difference between corresponding fuels of each series.

D-7/D-8

Attachment 1

OWNER'S QUESTIONNAIRE

CRC OCTANE NUMBER REQUIREMENT SURVEY

OWNER:

Your vehicle is being tested for fuel octane number requirements by a Coordinating Research Council activity. To help analyze the data, we would like the person who has recently been driving the vehicle to answer the following questions:

1. Has any engine knock (ping) been encountered with the fuel that is now in the tank?

   ☐ Yes ☐ Occasionally

   ☐ No ☐ Frequently

2. If "Yes" was it during any of these conditions?

   ☐ Low Speed ☐ Hill Climbing ☐ Normal Acceleration

   ☐ High Speed ☐ Towing Trailer ☐ Maximum Acceleration

3. Did you consider the knock (ping) objectionable?

   ☐ Yes ☐ No

4. With the fuel now in the tank, has the engine ever continued to run after the key was turned off?

   ☐ Yes ☐ No

5. If "Yes", did you consider the engine running with the key off objectionable?

   ☐ Yes ☐ No

Vehicle Make ______________________ License No. ____________

Vehcile Identification No. ______________________________

TECHNIQUE FOR DETERMINATION OF OCTANE NUMBER REQUIREMENTS OF LIGHT-DUTY VEHICLES

(CRC Designation E-15-81)

Revised

September 1980

Attachment 2

TECHNIQUE FOR DETERMINATION OF OCTANE NUMBER REQUIREMENTS OF LIGHT-DUTY VEHICLES

(CRC Designation E-15-81)

A. GENERAL

The technique provides for the determination of octane number requirements of a vehicle in terms of borderline spark knock and surface ignition knock, regardless of throttle position, on two series of full-boiling range reference fuels as well as on primary reference fuels. It also provides octane requirements throughout the speed range on primary reference fuels.

Spark knock, surface ignition, and after-run characteristics of tank fuel will also be determined.

B. DEFINITION OF TERMS

1. The following definitions of knock were approved by the CFR and CLR Committees on June 8, 1954, and will be used in this technique. Knock is the noise associated with autoignition* of a portion of the fuel-air mixture ahead of the advancing flame front. The flame front is presupposed to be moving at normal velocity. With this definition, the source of the normal flame front is immaterial; it may be the result of surface ignition or spark ignition.

    a. Spark Knock: A knock which is recurrent and repeatable in terms of audibility. It is controllable by the spark advance; advancing the spark increases the knock intensity, and retarding the spark reduces the intensity. This definition does not include surface ignition knock.

    b. Surface Ignition Knock: Knock which has been preceded by a surface ignition. It is not controllable by spark advance.** It may or may not be recurrent and repeatable.

---

* Autoignition: The spontaneous ignition and the resulting very rapid reaction of a portion or all of the fuel-air mixture. The flame speed is many, many times greater than that which follows normal spark ignition. There is no time reference for autoignition.

** For the purpose of this program, it is not intended that surface ignition knock be identified by manipulation of the spark advance.

2. The following definitions of knock intensity were specifically adopted for use in this technique:

   a. No Knock: This means no spark knock or surface ignition knock.

   b. Borderline Knock: This means spark knock of lowest audible intensity, recurrent surface ignition knock of borderline intensity, or infrequent (three or less) surface ignition knocks regardless of intensity.

   c. Above Borderline Knock: This means greater than borderline spark knock, recurrent suface ignition knock greater than borderline intensity, or frequent (four or more) surface ignition knocks regardless of intensity.

   d. After-Run: The engine continues to operate after the ignition is turned off.

3. Definition of Accelerations

   Accelerations are made at maximum-throttle and part-throttle conditions which are defined below:

   a. Maximum-Throttle: The throttle is depressed and held at detent throughout the acceleration. This could be in highest gear or passing gear for automatic transmissions. The detent manifold vacuum obtainable on a given model is determined by the transmission characteristics.

   b. Part-Throttle: The throttle is depressed and regulated throughout the acceleration to maintain a desired, constant critical manifold vacuum in highest gear. Part-throttle will constitute any throttle position above detent vacuum up to the highest road load vacuum,

   c. 50th Percentile: The throttle is depressed and regulated to maintain an acceleration profile representative of average customer driving patterns.

C. VEHICLE PREPARATION

The following vehicle preparation steps should be completed before any octane tests are run. Detailed procedures for each adjustment can be found in the manufacturers' shop manuals.

1. Record vehicle identification number and emission control type, Federal, Altitude, or California. Fill in heading on data sheet DFMF-11-1181. Ford emission calibration numbers are to be recorded.

2. Inspect all vacuum lines and air pump hoses for appropriate connections. Also, check to see if PCV valve, distributor vacuum delay valve, EGR valve, and heated inlet air mechanism are functioning. Engine must be warmed up for these checks.

3. Record engine idle speed and observe anti-dieseling solenoid operation. Adjust to manufacturers' recommended specifications as specified on the under-hood decal.

4. Observe and record basic spark timing at recommended engine speed. Adjust to manufacturers' recommended setting as specified on the under-hood decal.

5. Crankcase oil, radiator coolant, automatic transmission fluid, and battery fluid levels shall be maintained as recommended by the manufacturer.

6. A calibrated tachometer graduated in 100 rpm (or smaller) increments and capable of indicating engine speed from 0-5000 rpm shall be installed on each vehicle.

7. One calibrated vacuum gage, graduated in one-half inch of mercury (or smaller) increments and capable of indicating vacuum from 0-24 inches of mercury (0-81 KPa) shall be connected to the intake manifold.

8. An auxiliary fuel system shall be provided to supply test fuels to the engine. Caution shall be taken to avoid placing auxiliary fuel lines in locations which promote vapor lock. If vehicles with carbureted engines have tank return fuel lines, this return line should be blocked off. Disconnect fuel tank vent line at evaporation control system canister. Instructions for fuel handling with fuel injection systems are given in Appendix A.

9. For vehicles equipped with knock sensor systems, instrumentation should be installed as described in Appendix B.

10. For vehicles with owner questionnaire completed, a sample of the tank gasoline shall be withdrawn for determination of Research and Motor method octane number ratings.

D. <u>TEST PROCEDURE</u>

1. <u>Engine Warm-Up</u>

   a. To stabilize engine temperatures, a minimum of ten miles of warm-up is required. The test vehicle should be operated at 55 mph (88 kph) in top gear with a minimum of full-throttle operation.

   b. During the warm-up period, the general mechanical condition of the vehicle should be checked to insure satisfactory and safe operation during test work.

2. Fuel Change-Over

Caution: Because of the installation of catalytic devices on these vehicles, permanent damage may result if the engine runs lean or stalls. Therefore, change-over from one fuel to another must be accomplished without running the carburetor or fuel injection system dry. Fuel handling procedures for vehicles equipped with fuel injection systems are explained in Appendix A.

To eliminate contamination of the new fuel with residual amounts of the previous fuel, flush system twice with new fuel.

After fuel change-over, make o e maximum-throttle acceleration before beginning Vehicle Rating Procedure.

3. Details of Observations

a. Operating Conditions

All octane number requirements will be determined under level road acceleration conditions.

Manual Transmissions: Vehicles with 3- and 4-speed transmissions shall be rated in highest gear. Vehicles with 5-speed transmissions shall be rated in 4th gear.

Automatic Transmissions: Automatic transmissions shall be run in the highest gear possible.

Tests will be conducted on moderately dry days, preferably at ambient temperatures above 60°F (15.5° C). Tests should not be conducted during periods of high humidity such as prevail when rain is threatening or during or immediately after a rain storm. Laboratories with control capabilities should target for 70°F (21°C) air temperature and 50 grains of water per pound (7.14 gm/kg) of dry air whenever possible.

Air-conditioned vehicles will be tested with air conditioner turned ON. (Normal setting, low fan)

b. Order of Fuel Testing

1. Tank
2. FBRSU
3. FBRU
4. Primary

c. Determination of Knock Intensity

Octane requirements will be established by evaluating the occurrence of knock in terms of knock intensity:

"N" for none, "B" for borderline, and "A" for above borderline. Establishment of representative knock intensity for a given fuel will be accomplished with the fewest number of accelerations possible. As defined below, the first two duplicating accelerations are sufficient with "N" and "B" knock intensity.

Number of Accelerations 1	2	3	Representative Rating
N	N	-	N
N	B	N	N
N	B	B	B
B	N	B	B
B	B	-	B
B	A	-	A
A	-	-	A

All subsequent accelerations will normally be discontinued when "A" knock intensity is experienced, and testing continued with a higher octane number fuel in that series. An exception will be made if "A" knock is experienced on the highest octane fuel which knocks in the engine. In this case, it may be necessary to run additional accelerations to determine the speed of maximum knock intensity. If "A" knock is experienced at initiation of acceleration, as limited by transmission characteristics, this speed will be considered the speed of maximum knock. Otherwise, the midpoint between knock-in and knock-out will be considered the speed of maximum knock. When establishing knock-in and knock-out, back off on the throttle between points to eliminate "A" knock. Tip-in knock should be ignored.

d. Determination of Octane Requirements and After-Run Characteristics

Tests should be run to 60 mph (97 kph) unless required to terminate at 55 mph (88 kph) because of legal speed limits.

The procedure for knock sensor equipped-cars is shown in Appendix B.

1) Vehicle Operating Procedure (for driver)

a) For establishment of transmission characteristics, obtain top gear downshift engine rpm and manifold vacuum at 25, 35, 45, and 55 mph (40, 56, 72, 88 kph) by movement of the throttle through the detent position. Record both engine rpm and manifold vacuum at the downshift point for each speed.

The vehicle brakes may be applied lightly, if necessary, to maintain vehicle speed. In addition, for transmissions with converter clutches, determine the minimum vacuum and minimum road speed for converter clutch application. Record on data sheet.

b) For <u>maximum-throttle requirements in highest gear</u>, accelerate at the detent position from the minimum obtainable speed as determined in (a)* up to 60 mph (97 mph). If transmission downshifts, abort and start acceleration again.

c) For <u>maximum-throttle requirements in passing gear</u> for vehicles with automatic transmissions, accelerate from 10 mph (16 kph) below the starting speed for highest gear acceleration up to 60 mph (97 kph). When available, set shift gear selector to passing gear.

d) For those vehicles with vacuum delay devices, to stabilize vacuum advance before starting each part-throttle acceleration, operate at road load <u>for 40 seconds</u> at the speed from which the <u>acceleration is</u> to begin.

e) For <u>part-throttle requirements</u>, accelerate in highest gear at constant critical manifold vacuum from minimum obtainable speed to 60 mph (97 kph), or until vehicle ceases to accelerate. To obtain critical part-throttle vacuum, operate at road load for 40 seconds at 25, 35, 45, and 55 mph (40, 56, 72, and 88 kph). At each speed, move the throttle (in 3 to 5 seconds) from the highest road load vacuum down to detent manifold vacuum, or 1 inch Hg (3.4 KPa) above the minimum vacuum at which converter clutch engages. In this range, find a manifold vacuum for maximum knock intensity to use as the critical vacuum for all subsequent part-throttle accelerations. The vehicle brakes may be applied lightly, if necessary, to maintain vehicle speed, except for vehicles with converter clutch transmissions.

---

* Starting speed for accelerations on manual transmission vehicles should be the lowest speed from which the vehicle will accelerate smoothly.

f) For 50th percentile requirements, follow the driving cycle described in Modes 1 and 2 below:

Mode 1: Idle 20 seconds. Make a 50th percentile acceleration through the gears to 60 mph. Decelerate to 55 mph and cruise for 0.5 mile. Decelerate moderately to 30 mph.

Mode 2: Cruise at 30 mph for 0.2 mile. Make a 50th percentile acceleration to 60 mph. Decelerate to 55 mph and cruise for 0.5 mile. Decelerate moderately to a stop.

Run the number of cycles necessary to be consistent with the table on page 15. Complete cycles (both modes) should be performed regardless of the mode in which knock occurs.

The 50th percentile acceleration profile is shown in Appendix C.

g) Determination of After-Run Characteristics

Determination of the occurrence of after-run will be evaluated on tank fuel. Following the engine warm-up, moderately brake the vehicle to a stop (foot off throttle) and place automatic transmission vehicles in park position, manual transmission vehicles in neutral. Air conditioner must be turned off. Immediately turn key to the "OFF" position. Note on the data sheet if after-run occurs.

2) Vehicle Rating Procedure (for rater)

Knock rating should be performed while in a normal seated position (head above instrument panel) with floor mats in place.

Step 1 - Using a fuel estimated to give borderline knock in a given fuel series, investigate for incidence of knock under conditions as described in 3d(1)(b) above, and 3d(1)(c) above.

Step 2 - If no knock occurs, go to a lower octane number blend in that series and repeat Step 1.

Step 3 - If knock occurs at one or more of the operating conditions in Step 1, continue investigation at the critical condition(s) with higher octane blends until highest octane fuel giving knock is determined within one octane number or one blend. Record maximum knock intensity on all fuels and speed of maximum knock intensity on highest octane fuel that knocks.

Step 4 - Using the lowest octane blend that did not knock in Step 3, investigate for incidence of part-throttle knock as described in 3d (1)(e). If knock occurs, continue investigation at critical vacuum until requirement is defined. Record maximum knock intensity and critical manifold vacuum on all fuels, and speed of maximum knock intensity on highest octane fuel that knocks.

Step 5 - With FBRU fuel only, investigate for incidence of knock with 50th percentile accelerations as described in 3d(1)(f). If knock occurs, continue investigation using both modes with higher octane blends until highest octane fuel giving knock is determined within one octane number or one blend. If no knock occurs, investigate for knock with lower octane number fuels until the requirement is determined or the lowest octane number fuel has been used. Record maximum knock intensity on all fuels, and mode, manifold vacuum, and speed of maximum knock intensity on highest octane fuel that knocks.

The rating procedure is given in arrow diagram form on page 21.

e. Tank Fuel Observations on Vehicles with Owner's Questionnaire

Investigate for maximum-throttle and part-throttle knock as detailed in Item 3d(1). Define maximum knock intensity as per Item 3c. Record maximum knock intensity, speed of maximum knock intensity, and manifold vacuum at each operating condition. Determine after-run characteristics as described in Item 3d(1)(g).

f. Octane Number Requirement Over Speed Range

Octane requirements over the speed range will be obtained on primary reference fuels only using throttle position

for maximum requirements. These will be established by recording the knock-in and knock-out points during maximum requirement acceleration with each incremental fuel investigated. It may be necessary to test one or two additional lower octane fuels to describe the knocking characteristics over the speed range. Accelerate at maximum-throttle from minimum obtainable speed as determined in 3d(1)(a), up to 3500 rpm, if necessary, in order to define requirements. These should be run to 60 mph (97 kph) unless required to terminate at 55 mph (88 kph) because of legal speed limits. If 3500 rpm cannot be attained in top gear, accelerations shall be discontinued and resumed in the next highest gear from 500 rpm below the engine speed at which top gear accelerations were determined.

When "A" knock is experienced, continue the acceleration, but back off on the throttle to maintain "B" knock until just prior to the knock-out point.

E. INTERPRETATION OF DATA

The data will be recorded on data sheet DFMF-11-1181. Octane requirements for all reference fuels shall be determined as follows:

1. If the knock intensity of the highest fuel giving knock is borderline, the requirement shall be reported as the octane number of that fuel.

2. If the knock intensity of the highest fuel giving knock is above borderline, the requirement shall be reported as one-half the difference between the fuel giving knock and the next highest fuel.

Speed range data shall be reported on data sheet DFMF-11-1181 as the engine speed of knock-in and knock-out for the octane number of the primary reference fuel tested.

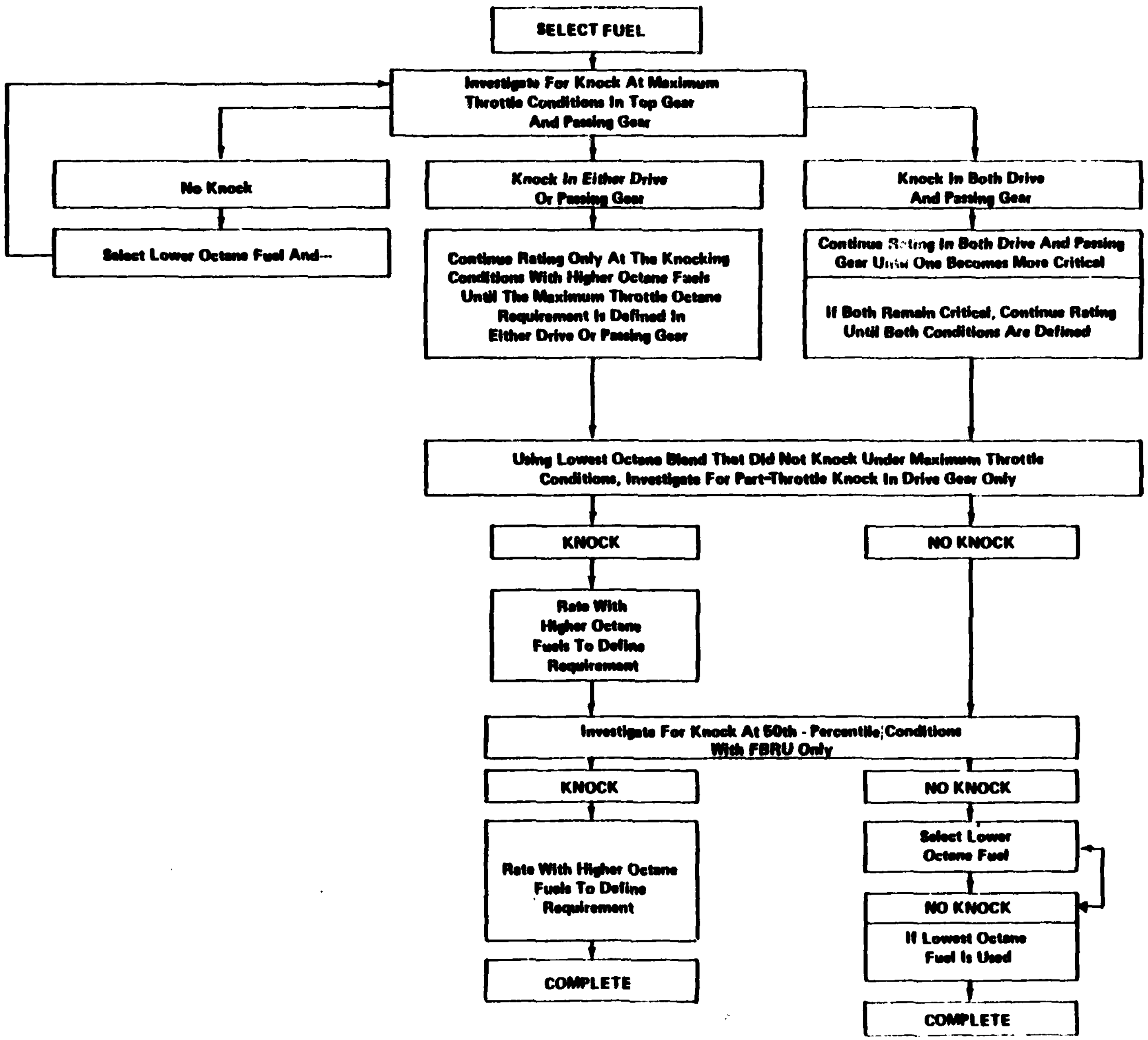
When transferring data to the summary report form, record "no" data as well as "yes" data.

Record data on all fuels tested, even though knock was not encountered. When transferring data to the summary report form DFMF-15-1181, record the higher among requirements under part-throttle and maximum-throttle condition for all fuels, and the 50th percentile requirement for FBRU fuel. Use proper letter designation (see footnotes on summary sheet) to designate requirements outside of the reference fuel limits.

Requirements for the various engine speeds will be determined by fitting a smooth curve through the knock-in and knock-out points

on work form DFMF-12-1181. Primary reference fuel requirements at various engine speeds should be reported to the nearest one-half octane number and recorded on the speed range summary sheets DFMF-25-1181.

It is important that the vehicle identification number (VIN) of each vehicle tested be recorded on all data and summary sheets to provide a means of cross-indexing.


SELECT FUEL
Investigate For Knock At Maximum Throttle Conditions In Top Gear And Passing Gear
No Knock
Select Lower Octane Fuel And--
Knock In Either Drive Or Passing Gear
Continue Rating Only At The Knocking Conditions With Higher Octane Fuels Until The Maximum Throttle Octane Requirement Is Defined In Either Drive Or Passing Gear
Knock In Both Drive And Passing Gear
Continue Rating In Both Drive And Passing Gear Until One Becomes More Critical
If Both Remain Critical, Continue Rating Until Both Conditions Are Defined
Using Lowest Octane Blend That Did Not Knock Under Maximum Throttle Conditions, Investigate For Part-Throttle Knock In Drive Gear Only
KNOCK
NO KNOCK
Rate With Higher Octane Fuels To Define Requirement
Investigate For Knock At 50th - Percentile Conditions With FBRU Only
KNOCK
NO KNOCK
Rate With Higher Octane Fuels To Define Requirement
COMPLETE
Select Lower Octane Fuel
NO KNOCK
If Lowest Octane Fuel Is Used
COMPLETE

APPENDIX A

CRC E-15-81 TECHNIQUE

APPENDIX A

CRC E-15-81 TECHNIQUE

Procedure For Setting Up Vehicles and Handling Reference Fuels -- Vehicles Equipped With Multiple-Port Fuel Injection

1. To run octane requirements on fuel injected vehicles it is necessary to run an external fuel line to the inlet of the vehicle fuel injection pump.

2. The fuel return line from the engine to the fuel tank must be disconnected after the fuel pressure regulator (in engine compartment) and before the fuel tank. An auxiliary line long enough to reach the cans must be added to the fuel return line.

3. Make certain that the fuel tank connections are plugged, this means both the normal fuel pump inlet line and the normal fuel return line connection. On vehicles with an in-tank booster pump, this pump must be shut off so it cannot run during the time the vehicle is operating on the external fuel system. If this pump is not disconnected, it will be destroyed.

4. An electric fuel pump (Bendix type acceptable) must be used to draw fuel from the reference fuel can to supply the fuel injection pump on the vehicle. Caution must be exercised to keep the fuel line between the reference fuel cans and the vehicle fuel injection pump full of fuel. If very much air gets into this line, the fuel injection system will become air bound and it is difficult to get the air out of the system.

5. Once the fuel injection pump line and return line have been disconnected, all subsequent operations must be done from an external fuel source.

6. It is possible to use three-way valves in the fuel line between the fuel pump and the fuel tank and between the return line and the fuel tank. When used, the operator must change the return line valve to the auxiliary fuel system while the engine is shut down, to avoid building up excessive pressure in the return line which could damage both the fuel pressure regulator and injection pump.

7. When changing from one reference fuel to another, the following steps must be followed:

   a. Put fuel inlet line in reference fuel tank with the return line going to a slop fuel can. Do not keep fuel inlet line out of the fuel can any longer than is necessary to move it from one can to the next. DO NOT RUN OUT OF FUEL.

b. Observe the fuel stream in the fuel return line. As soon as a steady flow of fuel is observed, move the fuel return line to an empty one-quart can (0.946 ℓ). Allow one quart (0.946 ℓ) of fuel to flow into this can before inserting the return line into the chosen reference fuel can. This operation should take about 60 seconds.

c. When going to the next reference fuel, it will be necessary to repeat Steps a and b.

The fuel injection pumps on most vehicles pump between 30 and 50 gallons (114-189 ℓ/h) of fuel per hour. Therefore, Steps a and b should be followed very closely or there will be gross reference fuel contamination, or you will use a lot more reference fuel than is required to run each test. If Steps a and b are followed exactly, you will be discarding to slop about two quarts (1.892 ℓ) of reference fuel each time you change reference fuels. The two quarts (1.892 ℓ) to slop will be at least as much fuel as is consumed to get the reference fuel rating.

Procedure For Setting Up Vehicles and Handling Reference Fuels -- Vehicles Equipped With Throttle-Body Fuel Injection

The General Motors throttle body fuel injection system is shown in the attached schematic drawing. The fuel supply system consists of an in-tank electric fuel pump, a full-flow fuel filter mounted on the vehicle frame, a fuel pressure regulator integral with the throttle body, fuel supply and return lines, and two fuel injectors. The injection timing and amount of fuel supplied is controlled by an electronic control module (not shown in figure). To prepare a vehicle with this system for octane requirement testing, an auxiliary electric fuel pump must be installed. The fuel pressure regulator controls fuel pressure at the injectors to a nominal 10.5 psi; therefore, an auxiliary pump capable of at least 10.5 psi outlet pressure must be used for satisfactory engine operation. The following procedure is recommended for preparing a vehicle with throttle body fuel injection for octane requirement testing and for changing reference fuels during such testing:

1. Disconnect and plug the fuel supply and fuel return lines at the locations shown in the figure. Install an additional line between the fuel supply line and the outlet of the auxiliary pump. Connect the inlet of the auxiliary pump to the reference fuel can. Connect the fuel return line to the reference fuel can through a tee at the auxiliary pump inlet. All auxiliary fuel lines are indicated by dashed lines in the figure.

2. An optional arrangement would be to use three-way selector valves in the fuel supply and fuel return lines at the locations where auxiliary fuel lines are connected. When these valves are used, the operator must change the valves to the external fuel system while the engine is shut off to avoid building up excessive pressure in the fuel return line.

3. Disconnect the in-tank fuel pump so it cannot run during the time the vehicle is operating on the external fuel system. If this pump is not disconnected, it may be destroyed.

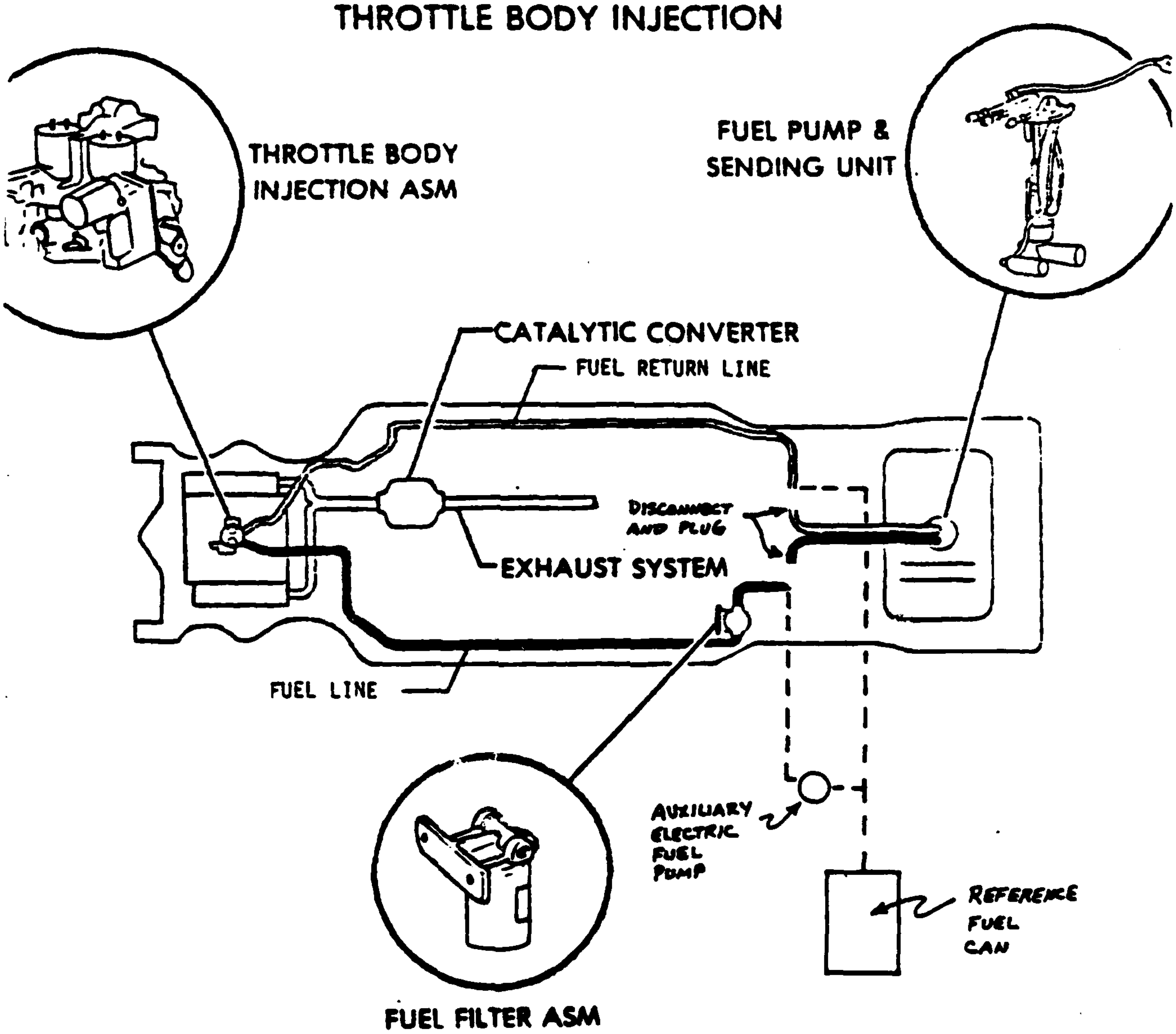
4. When changing from one reference fuel to another, the following steps should be followed:

   a. Disconnect fuel inlet line from reference fuel can and run engine a short time; do not run out of fuel since this will introduce air into the fuel injection system, and excessive cranking will be required to restart the engine.

   b. Insert fuel inlet line in desired reference fuel can; operate vehicle for two miles at a maximum speed of 55 mph during which time four part-throttle accelerations are made. This must be done to ensure that the vehicle fuel system has been purged and contains the desired reference fuel for octane rating.

   c. When changing to another reference fuel, repeat steps a and b.

THROTTLE BODY INJECTION



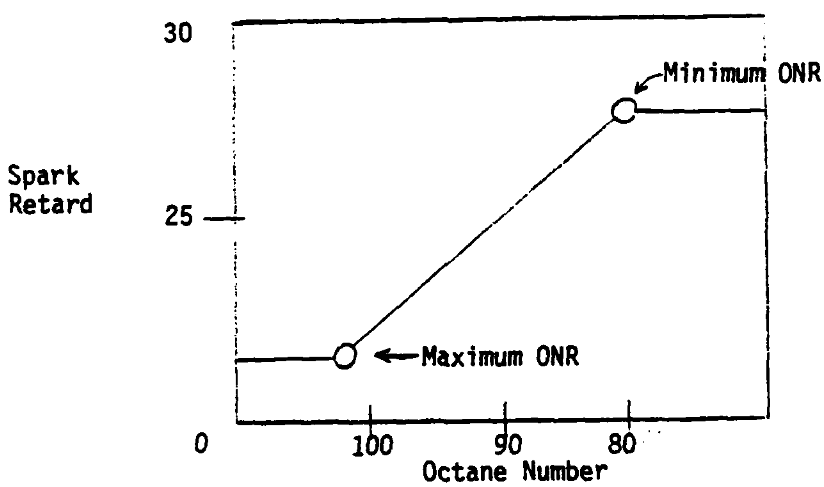
APPENDIX B

ONR MEASUREMENT WITH KNOCKSENSOR-EQUIPPED VEHICLES

ONR MEASUREMENT WITH KNOCK SENSOR EQUIPPED VEHICLES - INSTRUMENT METHOD

The test method will define the limits of the vehicles ability to adapt to varying fuel quality. This will be accomplished by observing the knock sensor output as a function of spark retard. Also, the fuel quality for borderline knock will be determined.

Prepare the vehicle according to Section C (Vehicle Preparation) and, in addition, install a spark retard indicator. Using an estimated non-knocking fuel, accelerate as defined in B-3 and observe spark retard. Using lower octane fuels, continue testing until the maximum octane requirement and minimum octane requirement have been determined. The maximum requirement is the fuel quality at which spark retard begins. The minimum requirement is the fuel quality at which the spark retard reaches a maximum. (See Figure)



Record knock intensity on all fuels for maximum and minimum octane in accordance with B-2. Also, determine the octane number of the fuel that gives borderline knock using the accelerations defined in B-3. Record the degrees of spark retard associated with the borderline knock.

Data should be recorded on data form DFMF-26-1181 and plotted on curve sheet DFMF-27-1181.

APPENDIX C

50th PERCENTILE ACCELERATION PROFILE

APPENDIX C

50th PERCENTILE ACCELERATION PROFILE

Driving Maneuver	Car Speed (MPH)	Cumulative Time (Sec.)
0-60 MPH Acceleration	0	0
	5	2.7
	10	5.0
	15	7.4
	20	9.9
	25	12.5
	30	15.2
	35	18.0
	40	20.9
	45	23.8
	50	26.8
	55	29.8
	60	32.8
30-60 MPH Acceleration	30	0
	35	2.8
	40	5.7
	45	8.6
	50	11.6
	55	14.6
	60	17.6

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June 10, 1981

Participants of the 1981 CRC-Light-Duty
Octane Number Requirement Survey

Gentlemen:

At our Group Meeting today we discussed a deficiency in the 50th percentile acceleration description. Preceding the Mode-one acceleration should be a preconditioning event as follows:

> Make a 50th percentile acceleration through the gears to 60 mph. Decelerate to 55 mph and cruise for 0.5 mile. Decelerate moderately to a stop.

This preconditioning event is on the tape-recorded instructions provided by J. D. Benson.

Another item also concerning the 50th percentile accelerations was the shift points to be used with manual transmission-equipped vehicles. In order to have some consistency, the following procedure was accepted:

> For manual transmissions, manufacturers' shift point recommendations should be followed. If the manufacturer does not recommend shift points, then make the 1-2 shift at 15 mph, the 2-3 shift at 25 mph, and for vehicles equipped with more than three speeds, shift from 3 to 4 at 40 mph.

Tim Wusz found two footnotes incorrectly numbered on data sheet DFMF-11-1181. In the TEST GEAR column the footnote number should be 9, not 4, and under FINAL RATING it should be 7 instead of 10.

Good luck with your testing!

Yours truly,

W J Brown

W. J. Brown, Leader
Octane Requirement Survey Group

WJB:ah

cc: Miss Beth Evans - CRC

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April 27, 1981

To: Participants in the 1981 CRC Octane Requirement Survey

At our Steering Panel meeting Wednesday, April 22, we discussed some details of the 1981 Program and thought it best to pass on to you the following information.

1. Knocksensor Vehicles

   The data forms for knocksensor vehicles DFMF-26-1181 provide space in the summary block for only one fuel. However, the vehicles are to be tested on all three reference fuel series FBRSU, FBRU and PR. Therefore, three separate data sheets should be used. Data from these vehicles will be analyzed separately from the statistical distribution so there is no key punch section to fill out on the forms.

2. 50th Percentile Acceleration

   Cassette recorder tapes have been sent to all the participants by Mr. J. D. Benson of GM, and you will receive them shortly.

3. Lockup and Overdrive Automatic Transmissions

   A summary of gear selection for testing is as follows:

   Place the selector in "D" or "O" and check for the critical condition.

GM 4 speed	4th gear, converter clutch engaged
	3rd gear, converter clutch disengaged
GM 3 speed	3rd gear, converter clutch engaged
	3rd gear, converter clutch disengaged
	2nd gear, converter clutch disengaged
Ford O.D.	4th gear
	3rd gear
	2nd gear

Yours truly,

W J Brown

W. J. Brown, Leader
Survey Steering Panel

WJB:ah

cc: Beth Evans - CRC

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September 10, 1981

To: Participants, 1981 CRC Octane Number Requirement Survey

Subject: 50th Percentile Reporting Data Form DFMF-11-1181

Jack Benson pointed out there is no provision in the summary block for a condition when both modes have equal octane requirements.

Gene Corner can accommodate this condition if we simply write in a number other than 1 or 2, so we decided on 3. Therefore, if the octane requirement is the same for both modes, put a 3 in column 71.

The problem in deciding which MPH, RPM and Man. Vac. to record in the summary block has a solution suggested by Dan Barnard. He favors reporting the milder condition since it would be the one most frequently encountered by the owner. Thus, if both modes have the same octane number, report the MPH and RPM corresponding to the highest manifold vacuum.

If you have sent in your data, Gene Corner will make the necessary changes.

Yours truly,

W J Brown

W. J. Brown, Leader
Survey Steering Panel

WJB:ah

cc: Dr. E. S. Corner
Miss Beth Evans - CRC

APPENDIX E

1981 OCTANE NUMBER REQUIREMENT SURVEY DATA

GLOSSARY

Emission Certification:	C	California
	F	Federal
	B	Both California and Altitude
Transmission:	A	Automatic
	M	Manual
Air Conditioner:	Y	Yes
	N	No
Spark Advance:	+	Before Top Center
	-	After Top Center
Test Fuel:	1	Tank Fuel
	2	FBRSU
	3	FBRU
	4	PR
Gear:	D	Drive, Automatic Transmissions
	P	Passing Gear, Automatic Transmissions
	1-5	Manual Transmissions
Octane Number Requirements: (expressed as Research ON)	L	Less than lowest available ON for FBRU and FBRSU fuels and less than 76 for PR fuels
	H	Higher than highest available ON for FBRU and FBRSU fuels and higher than 100 ON for PR fuels

Tank Fuel

Owner Report

Knock:	Y	Yes
	N	No
Objectionable:	Y	Yes
	N	No
After-Run:	Y	Yes
	N	No

Rater Report

Noise Intensity:	N	None
	B	Borderline
	A	Above Borderline
After-Run:	Y	Yes
	N	No

Octane Number Requirement Data

Throttle:	M	Maximum
	P	Part
Mode:	1	50th Percentile Acceleration Technique
	2	50th Percentile Acceleration Technique
	3	Mode 1 ON Requirement = Mode 2 ON Requirement

OBS NO	LAB NO	MODEL CODE	EMCT	TRANS	CR	AIR	SPARK ADVANCE AS RCD	SPARK ADVANCE AS TST	ODOM MILES	AMB TMP	BARO	HUM	FUEL	MAXIMUM OCT NO	MAXIMUM THR	MAXIMUM GEAR	MAXIMUM RPM	MAXIMUM MV	50TH PERCENTILE TECH OCT NO	50TH PERCENTILE TECH MPH	50TH PERCENTILE TECH RPM	50TH PERCENTILE TECH MV	MODE	FUEL	OWNER KNOCK	OWNER OCJ	OWNER ARUN	OCT NO RES	OCT NO MOT	RATER NINT	RATER GEAR	RATER RPM	RATER MV	RATER ARUN
175	6	BA F17	F	A	8.2	Y	- 3	- 3	6737	77	29.79	105	3	84.5	M	P	2400	1.2	84.0	45	3000	1.2	3	1										
													2	87.0	M	D	3000	1.2																
													4	85.0	M	D	3000	1.2																
178	6	BA F17	F	A	8.2	Y	- 3	- 3	6165	66	30.04	72	3	88.0	M	D	3200	1.4	87.0	52	3200	1.6	1	1										
													2	89.0	M	D	3050	1.4																
													4	85.0	M	D	3100	1.4																
116	5	BA F17M	F	M	8.2	N	0	0	8781	71	30.10	55	3	86.0	M	4	2000	0.0	85.0	45	2000	0.5	1	1	N		N	92.1	83.0	N				N
													2	88.0	M	4	1900	0.0																
													4	84.0	M	4	1900	0.0																
376	41	BA F17M	C	M	8.2	N	- 3	- 3	11440	77	29.84	63	3	94.0	P	3	3800	5.5	88.0	40	2600	0.8	3	1						N				N
													2	96.0	P	3	3600	5.5																
													4	89.0	M	3	3800	1.0																
203	4	DI 137	F	A	8.4	Y	+12	+12	11120	84	29.17	43	3	93.0	M	D	2200	1.0	93.0	53	2300	1.5	3	1	Y	Y	N	90.4	84.5	B	P	2550	1.1	N
													2	96.0	M	D	2300	1.1																
													4	90.0	M	D	2100	1.0																
378	41	DI 137	C	A	8.4	Y	+16	+16	6322	71	30.00	64	3	86.0	M	D	1950	1.2	85.0	50	2100	1.4	1	1						N				N
													2	86.0	M	D	2100	1.2																
													4	84.0	M	D	2000	1.2																
104	5	DI 252	F	A	8.5	Y	+16	+16	6033	69	30.22	72	3	97.0	P	D	1500	7.0	97.0	26	1350	8.0	1	1	Y	Y	N	92.2	82.0	A	D	1300	1.1	N
													2	H	P	D	1550	7.0																
													4	93.0	M	D	1350	1.1																
336	46	DI 252	F	A	8.5	Y	+16	+16	8344	74	29.58	90	3	90.0	M	D	1500	1.5	89.0	35	1400	4.0	3	1						N				
													2	91.0	M	D	1700	1.5																
													4	90.0	M	D	1600	1.5																

		VEHICLE DESCRIPTION								WEATHER				OCTANE NUMBER REQUIREMENT DATA MAXIMUM					50TH PERCENTILE TECH				TANK FUEL INFORMATION OWNER							RATER			
OBS NO	LAB NO	MODEL CODE	EMCT	TRANS	CR	AIR	SPARK ADVANCE AS RCD	AS TST	ODOM MILES	AMB TMP	BARO	HUM	FUEL	OCT NO	THR	GEAR	RPM	MV	OCT NO	MPH	RPM	MV	MODE	FUEL	KNOCK	OBJ	ARUN	OCT NO RES	MOT	NINT	GEAR	RPM	MV	ARUN
62	23	G9 F60	F	A	8.2	Y	+ 8	+10	6980	55	27.94	48	3	88.0	M	D	1800	0.6	87.0	40	1600	2.0	2	1						N				N
													2	90.0	M	D	1800	0.6																
													4	87.0	M	D	1800	0.6																
110	5	G9 F60	F	A	8.2	Y	+ 8	+10	4838	73	30.10	60	3	88.5	M	P	2400	0.9	86.0	48	2500	3.0	2	1										N
													2	89.0	M	P	2400	0.9																
													4	86.0	M	P	2250	0.9																
226	28	G9 F60	F	A	8.2	Y	+10	+10	7934	76	29.18	80	3	87.0	M	P	1600	2.0	84.0	52	1850	2.0	3	1	N		N			N				N
													2	88.0	M	P	1800	2.0																
													4	85.0	M	P	1700	2.0																
294	47	G9 F60	C	A	8.2	Y	+10	+10	5100	70	29.74	43	3	90.0	M	D	2000	1.0						1										
													2	92.0	M	D	2000	1.0																
													4	88.5	M	D	2000	1.0																
410	26	G9 F60	F	A	8.2	Y	+10	+10	12055	98	30.00	124	3	89.0	M	D	1700	0.4	88.0	36	1725	0.6	2	1				92.4	82 9	N				N
													2	91.0	M	D	1750	0.4																
													4	89.0	M	P	1800	0.5																
59	23	HCX 228	F	A	8.5	Y	+10	+10	5810	82	28.14	106	3	82.0	M	D	2450	2.0	80.0	58	2700	2.5	1	1						N				N
													2	84.0	M	P	2400	1.0																
													4	83.0	M	P	2200	1.0																
214	23	HCX 228	F	A	8.5	Y	+10	+10	9648	58			3	84.0	M	P	2300	1.2	78.0	50	3000	2.0	1	1						N				
													2	86.0	M	P	2300	1.2																
													4	84.0	M	P	2300	1.2																
47	29	HC5 225	F	A	8.2	Y	+ 4	+ 4	7554	70	30.10	59	3	92.0	M	P	2200	1.0	88.0	43	2200	2.2	3	1				92.4	83.7	A	P	2200	1.0	N
													2	94.0	M	P	2200	1.0																
													4	90.0	M	P	2200	1.0																

			VEHICLE DESCRIPTION								WEATHER			OCTANE NUMBER REQUIREMENT DATA												TANK FUEL INFORMATION								
							SPARK ADVANCE							MAXIMUM					50TH PERCENTILE TECH						OWNER			OCT NO		RATER				
OBS NO	LAB NO	MODEL CODE	EMCT	TRANS	CR	AIR	AS RCD	AS TST	ODOM MILES	AMB TMP	BARO	HUM	FUEL	OCT NO	THR	GEAR	RPM	MV	OCT NO	MPH	RPM	MV	MODE	FUEL	KNOCK	DBJ	ARUN	RES	MOT	NINT	GEAR	RPM	MV	ARUN
71	23	HC5 225	F	A	8.2	Y	+4	+4	7510	75	28.13	91	3	87.0	M	D	2400	1.0	84.0	35	2550	1.0	3	1						N				N
													2	90.0	M	D	2400	1 0																
													4	87.0	M	D	2400	1.0																
79	3	HC5 225	F	A	8.2	Y	+4	+4	8210	80	30.12	50	3	92.0	M	D	2400	1.0	90.0	55	3000	1 0	3	1										N
													2	94.0	M	D	2300	1.0																
													4	90.0	M	D	2200	1.0																
173	6	HC5 225	F	A	8.2	Y	+4	+4	12575	75	30.06	81	3	93.0	M	D	1650	1.3	93.0	47	1625	1.4	2	1										
													2	95.0	M	D	1600	1.3																
													4	90.0	M	D	1650	1.3																
197	4	HC5 225	F	A	8.2	N	+4	+4	6370	83	28.86	100	3	86.0	M	D	2450	1 5	84.0	43	2600	3.2	1	1	N		N	91 7	83 1	N				N
													2	88.0	M	P	2400	1.5																
													4	84.0	M	D	2300	1.5																
363	8	HC5 225	F	A	8.2	Y	+4	+4	11859	80	29.96	74	3	88.0	M	D	2200	1.0	85.0	35	2600	0.8	1	1	N		N			N				N
													2	90.0	M	D	2250	1.0																
													4	87.0	M	D	2300	1.0																
401	26	HC5 225	F	A	8.2	Y	+4	+4	23285	83	30.17	76	3	94.0	M	D	2450	0.3	93.0	52	2700	0.3	1	1				97.0	85.2	A	D	2500	0 3	N
													2	97.0	M	D	2500	0.3																
													4	89.5	M	D	2400	0.3																
416	26	HC5 225	F	A	8.2	Y	+4	+4	20170	70	30.02	75	3	96.0	M	D	2650	0.4	96.0	45	2500	0.5	2	1				92.4	82.6	A	D	2500	0 5	N
													2	99.0	M	D	2550	0.4																
													4	93.0	M	D	2600	0.4																
191	4	HFW 449	F	A	8.1	Y	+12	+12	9752	72	29.52	45	3	90.0	M	P	2900	0.5	80.0	44	1800	3.6	3	1	N		N	90.7	83.5	B	P	2600	0 5	N
													2	91.0	M	D	2500	0.5																
													4	87.0	M	P	2600	0.5																

VEHICLE DESCRIPTION										WEATHER			OCTANE NUMBER REQUIREMENT DATA											TANK FUEL INFORMATION										
														MAXIMUM					50TH PERCENTILE TECH						OWNER						RATER			
							SPARK ADVANCE																						OCT NO					
OBS NO	LAB NO	MODEL CODE	EMCT	TRANS	CR	AIR	AS RCD	AS TST	ODOM MILES	AMB TMP	BARO	HUM	FUEL	OCT NO	THR	GEAR	RPM	MV	OCT NO	MPH	RPM	MV	MODE	FUEL	KNOCK	ODOR	AROUN	RES	MOT	NINT	GEAR	RPM	MV	ARUN
70	23	HIA 238	F	A	8.0	Y	+15	+15	6557	72	29.02	118	3	89.0	M	D	1600	0.8	88.0	45	1500	0 8	1	1						N				N
													2	90.0	M	D	1600	0.8																
													4	89.0	M	D	1600	0.8																
72	23	HIA 238	F	A	8.0	Y	+15	+15	13607	78	28.04	136	3	92.0	M	D	1500	0.6	92.0	55	3000	1.0	3	1						A	D	1400	0 6	N
													2	95 0	M	P	2500	1 0																
													4	90.0	M	D	1500	0.6																
94	3	HIA 238	F	A	8.0	Y	+15	+15	17843	70	29.29	80	3	86.0	M	D	1900	1.0	85.0	47	1900	1.8	3	1				92 2	83 2	N				N
													2	86.0	M	D	1900	1.0																
													4	86.0	M	D	1900	1.0																
115	5	HIA 238	F	A	8.0	Y	+15	+15	5125	70	30.07	52	3	88.0	M	P	1700	1 1	87.0	48	1500	1.3	2	1	N		N	91.2	82 8	N				N
													2	88.0	M	D	1600	1.5																
													4	88.0	M	P	1650	1.1																
150	6	HIA 238	F	A	8.0	Y	+12	+15	16780	81	29.98	93	3	95.0	M	D	1700	1.0	95.0	50	1600	1.5	2	1										
													2	97.0	M	D	1600	1.0																
													4	93.0	M	D	1500	1.0																
192	4	HIA 238	F	A	8.0	Y	+14	+14	8282	80	29.53	63	3	89.0	M	D	1850	0.9	87.0	46	1850	1.6	2	1	Y	N	N	93.7	84.0	N				N
													2	90.0	M	D	1800	0.9																
													4	90.0	M	D	1900	0.9																
340	46	HIA 238	F	A	8.0	Y	+15	+15	10083	76	29.28	110	3	86.0	M	D	1900	1.0	85.0	30	1800	2.0	1	1						N				
													2	87.0	M	D	1900	1.0																
													4	86.0	M	D	1900	1.0																
341	46	HIA 238	F	A	8.0	Y	+15	+15	9581	78	29.58	120	3	88.0	M	D	2150	1.0	87.0	45	1900	2.0	3	1						N				
													2	90.0	M	D	2100	1.0																
													4	88.0	M	D	1950	1.0																

VEHICLE DESCRIPTION										WEATHER			OCTANE NUMBER REQUIREMENT DATA												TANK FUEL INFORMATION									
														MAXIMUM					50TH PERCENTILE TECH						OWNER					RATER				
							SPARK ADVANCE																					OCT NO						
OBS NO	LAB NO	MODEL CODE	EMCT	TRANS	CR	AIR	AS RCD	AS TST	ODOM MILES	AMB TMP	BARO	HUM	FUEL	OCT NO	THR	GEAR	RPM	MV	OCT NO	MPH	RPM	MV	MODE	FUEL	KNOCK	OBJ	ARUN	RES	MOT	NINT	GEAR	RPM	MV	ARUN
342	46	HIA 238	F	A	8.0	Y	+15	+15	7928	78	29.27	103	3	85.5	M	D	2150	1.0	85.0	45	1800	1.0	3	1						N				
													2	87 0	M	D	2300	1.0																
													4	86.0	M	D	1950	1 0																
343	46	HIA 238	F	A	8 0	Y	+15	+15	8635	77	29 41	78	3	91.0	M	D	2100	1 0	89 5	50	1900	1.0	1	1						N				
													2	92.0	M	D	2250	1.0																
													4	89.0	M	D	1900	1.0																
344	46	HIA 238	F	A	8 0	Y	+15	+15	7984	72	29 12	86	3	89 0	M	D	1950	1 0	87.5	45	1750	1.0	1	1						N				
													2	89 5	M	D	2000	1.0																
													4	88.0	M	D	1900	1.0																
348	46	HIA 238	F	A	8 0	Y	+15	+15	8473	78	29 38	122	3	89 0	M	D	1900	1.0	87.0	50	2100	1 0	2	1						N				
													2	89 0	M	D	1900	1 0																
													4	87.0	M	D	2000	1.0																
351	46	HIA 238	F	A	8 0	Y	+15	+15	9940	76	29.50	90	3	86.0	M	D	2800	1.0	85.0	45	2800	2.0	3	1						N				
													2	87.0	M	D	2800	1.0																
													4	85.0	M	D	2600	1 0																
362	8	HIA 238	F	A	8 0	Y	+15	+15	6467	85	29.64	91	3	88 0	M	D	1750	0 9	87 0	43	2500	1.6	1	1	N		N			N				N
													2	90.0	M	D	1650	0 9																
													4	88.0	M	D	1700	0.9																
7	40	HIS 243	F	A	8 3	Y	+12	+12	10086	75	29.42	82	3	91.0	M	D	1300	3 0	90.0	45	1400	3.0	2	1	N		N	92 9	84 9	N				N
													2	93.0	M	D	1400	2 5																
													4	92.0	M	D	1400	2.5																
114	5	ICX 228	F	A	8.5	N	+10	+10	4202	70	30.04	52	3	85.0	M	P	2400	1 2	80.0	58	2700	2.0	1	1	N		N	92.2	84.0	N				N
													2	86 0	M	P	2850	1 2																
													4	84.0	M	P	2400	1.2																

OBS NO	LAB NO	MODEL CODE	EMCT	TRANS	CR	AIR	SPARK ADVANCE AS RCD	SPARK ADVANCE AS TST	ODOM MILES	AMB TMP	BARO	HUM	FUEL	MAXIMUM OCT NO	MAXIMUM THR	MAXIMUM GEAR	MAXIMUM RPM	MAXIMUM MV	50TH PERCENTILE OCT NO	50TH PERCENTILE MPH	50TH PERCENTILE RPM	50TH PERCENTILE MV	TECH MODE	TECH FUEL	OWNER KNOCK	OWNER OBJ	OWNER ARUN	OCT NO RES	OCT NO MOT	RATER NINT	RATER GEAR	RATER RPM	RATER MV	RATER ARUN
274	47	ICX 228	C	A	8.5	Y	+ 8	+10	6300	70	29.60	50	3	86.0	M	D	2100	0.8	85.0	55	2300	2.5	3	1										
													2	87.0	M	D	2250	0.8																
													4	86.0	M	D	2200	0.8																
360	8	ICX 228	F	A	8.5	Y	+10	+10	18175	80	30.00	64	3	82.0	M	D	2250	0.9	80.0	30	2200	4.5	1	1	N		N			N				N
													2	80.0	M	D	2200	1.8																
													4	80.0	M	P	3100	0.9																
61	23	IC5 225	F	A	8.2	Y	+ 4	+ 4	6151	73	28.13	122	3	89.0	M	D	2600	0.8	87.0	57	2700	1.0	2	1						N				N
													2	91.0	M	D	2600	0.8																
													4	89.0	M	P	2200	0.8																
73	23	IC5 225	F	A	8.2	Y	+ 4	+ 4	10139	70	28.14	86	3	92.0	M	D	2400	0.6	90.0	57	3500	1.0	3	1						A	P	2200	0.8	N
													2	95.0	M	D	2500	0.6																
													4	90.0	M	D	2400	0.6																
193	4	IC5 225	F	A	8.2	Y	+ 4	+ 4	9730	77	29.42	40	3	88.0	M	D	2350	0.8	85.0	37	2250	0.8	1	1	N		N	91.3	83.5	N				N
													2	89.0	M	D	2400	0.8																
													4	88.0	M	P	2500	0.6																
218	28	IC5 225	F	A	8.2	Y	+ 4	+ 4	12324	71	29.48	88	3	94.0	M	D	2200	1.5	93.0	49	2100	1.5	3	1	Y	Y	N	93.4	83.4	B	D	2200	1.5	N
													2	96.0	M	D	2400	1.5																
													4	91.0	M	D	1900	1.5																
271	7	IC5 225	F	A	8.2	Y	+ 2	+ 4	13960	72	30.13	59	3	94.0	M	D	2600	1.4	90.0	52	3200	1.5	3	1										
													2	96.0	M	P	3400	1.4																
													4	91.0	M	P	3250	1.4																
355	46	IC5 225	F	A	8.2	Y	+ 4	+ 4	10946	76	29.38	112	3	84.0	M	D	2200	1.0	83.0	45	2200	1.0	3	1						N				
													2	85.0	M	D	2400	1.0																
													4	82.0	M	D	2400	1.0																

VEHICLE DESCRIPTION OBS NO	LAB NO	MODEL CODE	EMCT	TRANS	CR	AIR	SPARK ADVANCE AS RCD	SPARK ADVANCE AS TST	ODOM MILES	WEATHER AMB TMP	BARO	HUM	OCTANE NUMBER REQUIREMENT DATA FUEL	MAXIMUM OCT NO	THR	GEAR	RPM	MV	50TH PERCENTILE TECH OCT NO	MPH	RPM	MV	MODE	FUEL	TANK FUEL INFORMATION OWNER KNOCK	OBJ	ARUN	OCT NO RES	OCT NO MOT	RATER NINT	GEAR	RPM	MV	ARUN
42	29	IIA 238	F	A	8.0	Y	+15	+15	7653	70	30.24	59	3	90.5	M	P	1600	0.6	90.5	43	1600	1.5	1	1				91.6	83.7	B	D	1600	1.0	N
													2	94.0	M	P	1600	0.6																
													4	90.0	M	D	1550	1.0																
64	23	IIA 238	F	A	8.0	Y	+15	+15	13282	68	27.83	82	3	89.0	M	D	1600	0.8	89.0	35	1600	1.0	1	1						N				N
													2	90.0	M	P	1700	0.6																
													4	90.0	M	D	1700	0.8																
68	23	IIA 238	F	A	8.0	Y	+14	+15	17548	68	28.14	77	3	92.0	M	D	1500	1.0	91.0	45	1400	1.0	1	1						B	D	1500	1.0	N
													2	93.0	M	D	1500	1.0																
													4	91.0	M	D	1500	1.0																
75	23	IIA 238	F	A	8.0	Y	+15	+15	7917	68	28.03	74	3	90.0	M	P	1700	0.8	89.0	35	1850	1.0	3	1						B	P	1700	0.8	N
													2	92.0	M	P	1700	0.8																
													4	89.0	M	P	1700	0.8																
83	3	IIA 238	F	A	8.0	Y	+15	+15	6173	78	29.79	83	3	88.0	M	P	2300	1.0	88.0	45	2000	1.5	1	1										N
													2	88.0	M	P	2200	1.0																
													4	85.0	M	P	2000	1 0																
113	5	IIA 238	F	A	8.0	Y	+15	+15	8690	70	29.98	48	3	90.0	M	D	1750	1.4	90.0	53	1750	1.4	1	1										N
													2	91.0	M	D	1750	1 4																
													4	89.0	M	P	1700	0.8																
159	6	IIA 238	F	A	8.0	Y	+15	+15	8410	88	30.10	98	3	87.0	M	D	1600	1.4	88.0	40	1500	2.0	3	1										
													2	89.0	M	D	1500	1.4																
													4	88.0	M	D	1600	1.4																
171	6	IIA 238	F	A	8.0	Y	+15	+15	10627	76	30.03	52	3	H	M	D	1500	2.0	H	50	1500	2.0	1	1										
													2	101.0	M	D	1500	2.0																
													4	100.0	M	D	1500	2.0																

VEHICLE DESCRIPTION										WEATHER			OCTANE NUMBER REQUIREMENT DATA												TANK FUEL INFORMATION									
														MAXIMUM					50TH PERCENTILE TECH						OWNER					RATER				
							SPARK ADVANCE																											
OBS NO	LAB NO	MODEL CODE	EMCT	TRANS	CR	AIR	AS RCD	AS TST	ODOM MILES	AMB TMP	BARO	HUM	FUEL	OCT NO	THR	GEAR	RPM	MV	OCT NO	MPH	RPM	MV	MODE	FUEL	KNOCK	OBJ	ARUN	OCT NO RES	OCT NO MOT	NINT	GEAR	RPM	MV	ARUN
202	4	IIA 238	F	A	8.0	Y	+14	+14	10680	83	29.23	54	3	86.0	M	D	1750	1.2	86.0	43	1600	1.3	3	1	N		N	90.4	84.5	N				N
													2	86.0	M	D	1800	1.2																
													4	86.0	M	P	1750	1.2																
222	28	IIA 238	F	A	8.0	Y	+15	+15	16437	73	29.32	90	3	87.0	M	D	1500	1.5	85.0	25	1500	3.5	1	1	N		N	93.3	83.5	N				N
													2	87.0	M	D	1500	1.5																
													4	87.0	M	D	1700	1.5																
251	7	IIA 238	F	A	8.0	Y	+15	+15	15000	72	30.17	44	3	92.0	P	D	1650	8.0	91.0	43	1500	1.0	3	1										N
													2	98.0	P	D	1650	8.0																
													4	90.0	M	D	1700	0.8																
254	7	IIA 238	F	A	8.0	Y	+12	+15	4600	74	30.28	48	3	94.0	M	D	1550	0.9	94.0	28	1500	6.0	3	1	Y	Y	Y	96.1	86.4	B	P	2700	1.1	Y
													2	94.0	M	D	1900	1.0																
													4	92.0	M	D	1700	0.9																
276	47	IIA 238	C	A	8.0	Y	+13	+15	10550	70	29.76	62	3	H	P	D	1600	6.0	100.0	30	1500	6.0	1	1										
													2	H	P	D	1600	6.0																
													4	92.5	P	D	1600	6.0																
284	47	IIA 238	C	A	8.0	Y	+15	+15	19940	70	29.64	60	3	88.0	M	D	1700	0.0	87.0	52	2000	2.9	3	1										
													2	89.0	M	D	1700	0.0																
													4	88.5	M	D	1700	0.0																
285	47	IIA 238	C	A	8.0	Y	+12	+15	8800	70	29.62	60	3	95.5	P	D	1500	5.0	95.0	30	1500	5.0	1	1										
													2	99.0	P	D	1500	5.0																
													4	90.5	M	D	1400	1.0																
349	46	IIA 238	F	A	8.0	Y	+15	+15	13055	74	29.28	83	3	89.0	M	D	1700	1.0	84.0	45	2100	1.5	3	1						N				
													2	89.0	M	D	1700	1.0																
													4	89.0	M	D	1700	1.0																

		VEHICLE DESCRIPTION								WEATHER			OCTANE NUMBER REQUIREMENT DATA												TANK FUEL INFORMATION									
														MAXIMUM					50TH PERCENTILE TECH						OWNER					RATER				
							SPARK ADVANCE																						OCT NO					
OBS NO	LAB NO	MODEL CODE	EMCT	TRNS	CR	AIR	AS RCD	AS TST	ODOM MILES	AMB TMP	BARO	HUM	FUEL	OCT NO	THR	GEAR	RPM	MV	OCT NO	MPH	RPM	MV	MODE	FUEL	KNOCK	OBJ	ARUN	RES	MOT	NINT	GEAR	RPM	MV	ARUN
371	41	IIA 238	C	A	8.0	Y	+13	+15	6298	71	29.98	64	3	96.0	P	D	3000	4.9	91.0	43	1600	1.2	3	1	N		N	96.1	85.0	B	D	2900	5.0	N
													2	H	P	D	2950	4.8																
													4	90.0	M	D	1900	1.2																
394	26	IIA 238	F	A	8.0	Y	+19	+15	5448	93	29.98	134	3	87.0	M	D	1600	0.3	84.5	35	1700	1.0	2	1				92.4	82.9	N				N
													2	87.0	M	D	1600	0.3																
													4	86.0	M	P	1550	0.3																
298	47	IIF 243	C	A	7.5	Y	+20	+20	12417	70	29.76	62	3	87.0	M	D	2000	0.6	86.5	50	2000	0.5	3	1						N				N
													2	89.5	M	P	2850	0.0																
													4	86.5	M	D	1950	0.6																
404	26	IIF 243	F	A	7.5	Y	+20	+20	7243	96	29.87	137	3	94.0	P	D	1700	6.5	91.0	25	1700	4.0	1	1				92.3	82.9	B	D	1600	6.5	N
													2	96.0	P	D	1700	6.5																
													4	88.0	M	D	1650	1.5																
156	6	IF 243	F	A	7.5	Y	+20	+18	17305	82	29.86	85	3	94.0	M	D	1900	2.0	94.0	45	2000	2.0	2	1	N		N	95.5	86.3	B	D	1900	2.0	N
													2	96.0	M	D	2000	2.0																
													4	92.0	M	D	2000	2.0																
151	6	IY 450	F	A	7.9	Y	+15	+15	11125	87	29.95	106	3	87.0	M	D	1600	2.0	85.0	30	1600	3.0	1	1										
													2	89.0	M	D	1600	2.0																
													4	88.0	M	D	1600	2.0																
407	26	IY 450	F	A	7.9	Y	+15	+15	10057	95	29.95	131	3	87.0	M	D	1100	1.6	83.0	38	1600	2.0	3	1				92.2	82.8	N				N
													2	87.0	M	D	1025	1.6																
													4	85.0	M	P	1625	0.7																
24	29	KL 217	F	A	8.2	N	+10	+10	10190	70	29.77	60	3	85.0	M	D	2000	0.8	82.0	30	2150	2.5	3	1	N		N	92.2	83.9	N				N
													2	89.0	M	D	2000	0.8																
													4	83.0	M	P	2000	0.3																

			VEHICLE DESCRIPTION							WEATHER			OCTANE NUMBER REQUIREMENT DATA															TANK FUEL INFORMATION						
														MAXIMUM					50TH PERCENTILE TECH						OWNER					RATER				
							SPARK ADVANCE																											
OBS NO	LAB NO	MODEL CODE	EMCT	TRANS	CR	AIR	AS RCD	AS TST	ODOM MILES	AMB TMP	BARO	HUM	FUEL	OCT NO	THR	GEAR	RPM	MV	OCT NO	MPH	RPM	MV	MODE	FUEL	KNOCK	OBJ	ARUN	OCT NO RES	OCT NO MOT	NITR	GEAR	RPM	MV	ARUN
103	5	KL 217	F	A	8.2	N	+10	+10	10132	70	29.83	40	3	84.0	M	D	2400	1.5	82.0	45	2700	1.6	3	1	N		N	93.9	83.4	N				Y
													2	85.0	M	D	2400	1.5																
													4	84.0	M	D	2400	1.5																
167	6	KL 217	F	A	8.2	Y	+10	+10	9880	75	30.03	49	3	85.0	M	D	2200	0.5	85.0	40	2200	0.5	3	1	N		Y	92.3	83.4	N				N
													2	87.0	M	D	2200	0.5																
													4	82.0	M	D	2200	0.4																
253	7	KL 217	F	A	8.2	N	+10	+10	7089	70	30.06	50	3	86.0	M	D	3450	1.4	84.0	52	3000	4.8	3	1	N		Y	91.4	83.5	N				N
													2	88.0	P	D	2600	2.0																
													4	84.0	M	D	3250	1.4																
353	46	KL 217	F	A	8.2	Y	+12	+12	15450	70	29.40	65	3	78.0	M	D	2500	1.5	L					1						N				
													2	78.0	M	D	2500	1.5																
													4	78.0	M	D	2500	1.5																
235	28	KL 222M	F	M	8.5	Y	+10	+10	12248	82	29.48	102	3	95.0	P	4	1900	2.0	96.0	53	2900	3.0	3	1	Y	Y	N	93.1	83.7	8	4	1500	2.0	N
													2	95.0	P	4	1900	2.0																
													4	91.0	P	4	1500	2.0																
14	22	KC 222	F	A	8.5	Y	+10	+10	6678	70	29.13	62	3	84.5	M	D	2250	1.0	82.0	39	2000	1.8	2	1	Y	N	Y			N				Y
													2	86.0	M	D	2000	1.2																
													4	80.0	M	D	2250	1.0																
55	29	KC 222	F	A	8.5	Y	+10	+10	11721	70	30.02	55	3	89.0	M	P	2200	0.8	87.0	32	1900	1.0	1	1						N				N
													2	92.0	M	P	2100	0.8																
													4	88.0	M	P	2200	0.8																
164	6	KC 222	F	A	8.5	Y	+10	+10	8840	83	30.04	101	3	90.0	M	D	2000	1.5	90.0	45	2100	2.0	1	1										
													2	91.0	M	D	2300	1.5																
													4	88.0	M	D	2000	1.5																

VEHICLE DESCRIPTION — WEATHER — OCTANE NUMBER REQUIREMENT DATA (MAXIMUM; 50TH PERCENTILE TECH) — TANK FUEL INFORMATION (OWNER; RATER)

OBS NO	LAB NO	MODEL CODE	EMCT	TRANS	CR	AIR	SPARK ADVANCE AS RCD	SPARK ADVANCE AS TST	ODOM MILES	AMB TMP	BARO	HUM	FUEL	MAXIMUM OCT NO	THR	GEAR	RPM	MV	50TH PERCENTILE TECH OCT NO	MPH	RPM	MV	MODE	FUEL	OWNER KNOCK	OBJ	ARUN	OCT NO RES	OCT NO MOT	RATER NINT	GEAR	RPM	MV	ARUN
236	28	KC 222	F	A	8.5	Y	+10	+10	9315	79	29.38	70	3	91.0	M	D	2650	1.0	90.0	48	2200	1.5	2	1						N				N
													2	92.0	M	D	2400	1.0																
													4	87.0	M	D	2000	1.0																
237	28	KC 222	F	A	8.5	Y	+10	+10	12292	79	29.35	80	3	90.0	M	D	2150	2.0	90.0	34	2300	2.5	1	1	N		Y	93.5	83.9	N				N
													2	91.0	M	D	2100	2.0																
													4	88.0	M	D	2100	2.0																
339	46	KC 222	F	A	8.5	Y	+10	+10	7876	68	29.33	74	3	85.0	M	D	1700	1.5	78.0	45	2400	1.0	1	1						N				
													2	85.0	M	D	1700	1.5																
													4	82.0	M	D	1700	1.5																
49	29	KC 222M	F	M	8.5	Y	+10	+10	12300	70	29.77	60	3	92.0	P	4	700	2.0	89.0	25	1100	0.3	1	1						N				N
													2	92.5	P	4	700	2.0																
													4	92.0	P	4	700	2.0																
234	28	KC 222M	F	M	8.5	Y	+10	+10	14781	69	29.31	86	3	88.0	M	4	1700	0.3	88.0	37	1800	2.5	1	1						N				N
													2	90.0	M	4	1700	0.3																
													4	88.0	M	4	1600	0.3																
238	28	KC 226	F	A	8.2	Y	+ 7	+ 7	12597	73	29.54	80	3	93.0	M	D	2600	1.5	85.0	54	2400	2.0	2	1						N				N
													2	94.0	M	D	2600	1.5																
													4	90.0	M	D	2700	1.5																
52	29	KI 137	F	A	8.4	Y	+12	+12	12665	70	30.20	57	3	94.5	M	D	1600	0.4	92.5	30	1700	1.2	1	1				92.7	83.5	N				N
													2	99.0	M	P	2700	0.4																
													4	90.5	M	D	1700	0.5																
138	6	KI 137	F	A	8.4	Y	+12	+12	14281	82	30.09	85	3	96.0	M	D	2100	1.2	96.0	52	2050	1.2	3	1										
													2	98.0	M	D	2050	1.2																
													4	92.0	M	D	2100	1.2																

VEHICLE DESCRIPTION										WEATHER			OCTANE NUMBER REQUIREMENT DATA												TANK FUEL INFORMATION									
							SPARK ADVANCE							MAXIMUM					50TH PERCENTILE TECH						OWNER					RATER				
OBS NO	LAB NO	MODEL CODE	EMCT	TRANS	CR	AIR	AS RCD	AS TST	ODOM MILES	AMB TMP	BARO	HUM	FUEL	OCT NO	THR	GEAR	RPM	MV	OCT NO	MPH	RPM	MV	MODE	FUEL	KNOCK	OBJ	ARUN	OCT NO RES	OCT NO MOT	NINT	GEAR	RPM	MV	ARUN
170	6	KI 137	F	A	8.4	Y	+ 8	+12	8640	74	30.07	78	3	95.0	M	P	2700	1.0	95.0	55	2400	1.5	3	1										
													2	96.0	M	P	2700	1.0																
													4	92.0	M	D	2000	1.4																
409	26	KI 137	F	A	8.4	Y	+12	+12	9571	90	30.00	107	3	90.0	M	D	2300	0.9	89.0	56	2400	0.9	2	1				93.0	83.0	B	P	1850	0.5	N
													2	90.0	M	D	2100	0.9																
													4	88.0	M	D	1950	0.9																
398	26	KI 252	F	A	8.5	Y	+16	+16	9944	94	30.00	119	3	97.0	P	D	1450	7.0	95.0	27	1300	7.0	1	1				92.6	83.0	A	D	1500	1.0	N
													2	99.0	P	D	1450	7.0																
													4	90.0	M	D	1450	1.0																
91	3	LCX 228	F	A	8.5	Y	+10	+10	8280	72	29.93	62	3	86.0	M	P	2700	0.7	84.0	45	2600	2.5	3	1	N		N	92.6	82.0	N				N
													2	87.0	M	P	2700	0.7																
													4	84.0	M	P	2700	0.7																
190	4	LCX 228	F	A	8.5	N	+10	+10	5542	75	29.32	44	3	86.0	M	D	2450	1.0	84.0	47	2250	3.5	2	1	N		N	92.0	82.4	B	P	2100	0.8	N
													2	88.0	M	D	2500	1.0																
													4	85.0	M	P	2300	0.8																
219	28	LCX 228	F	A	8.5	Y	+10	+10	8833	69	29.50	67	3	82.0	M	D	2500	1.5	80.0	55	2650	2.5	2	1						N				N
													2	84.0	M	D	2500	1.5																
													4	82.0	M	D	2600	1.5																
270	7	LCX 228	F	A	8.5	Y	+10	+10	6936	70	30.40	60	3	84.0	M	P	2600	1.0	83.0	50	2400	2.5	2	1	N		N	90.8	81.8	N				N
													2	85.0	M	D	2500	1.2																
													4	84.0	M	D	2550	1.2																
345	46	LCX 228	F	A	8.5	Y	+10	+10	14398	76	29.60	70	3	84.0	M	D	2400	1.0	82.0	38	2400	3.5	2	1						N				
													2	84.0	M	D	2500	1.0																
													4	83.0	M	D	2700	1.0																

			VEHICLE DESCRIPTION							WEATHER			OCTANE NUMBER REQUIREMENT DATA												TANK FUEL INFORMATION									
														MAXIMUM					50TH PERCENTILE TECH						OWNER					RATER				
							SPARK ADVANCE																					OCT NO						
OBS NO	LAB NO	MODEL CODE	EMCT	TRNS	CR	AIR	AS RCD	AS TST	ODOM MILES	AMB TMP	BARO	HUM	FUEL	OCT NO	THR	GEAR	RPM	MV	OCT NO	MPH	RPM	MV	MODE	FUEL	KNOCK	OBJ	ARUN	RES	MOT	NINT	GEAR	RPM	MV	ARUN
92	3	LC5 225	F	A	8.2	Y	+ 4	+ 4	5925	74	29.93	92	3	95.0	M	D	2500	1.0	95.0	55	2500	1.0	3	1	Y	N	N	91.9	82.5	A	D	2400	1.5	N
													2	95.0	M	D	2500	1.0																
													4	92.0	M	D	2500	1.0																
154	6	LC5 225	F	A	8.2	Y	+ 4	+ 4	9150	87	29.84	118	3	93.0	M	P	2500	1.0	92.0	50	2600	1.4	1	1	Y	N	N	92.4	83.4	A	P	2500	1.0	N
													2	96.0	M	P	2500	1.0																
													4	92.0	M	P	2500	1.0																
217	28	LC5 225	F	A	8.2	Y	+ 4	+ 4	13121	70	29.44	72	3	96.0	M	P	3500	1.0	96.0	55	3600	1.0	1	1						A	P	3500	1.0	N
													2	99.0	M	P	3500	1.0																
													4	91.0	M	P	2500	1.0																
384	41	LC5 225	C	A	8.2	Y	+ 4	+ 4	6590	77	30.04	64	3	92.0	M	D	2600	0.8	90.0	50	2500	0.8	2	1						B	D	2500	0.8	N
													2	94.0	M	D	2500	0.8																
													4	90.0	M	D	2600	0.8																
57	23	LIA 238	F	A	8.0	Y	+15	+15	8020	65	28.03	60	3	88.0	M	D	1600	1.0	87.0	55	2200	1.0	1	1						N				N
													2	88.0	M	D	1500	1.0																
													4	88.0	M	D	1600	1.0																
66	23	LIA 238	F	A	8.0	Y	+15	+15	7495	73	28.25	40	3	90.0	M	D	1500	1.2	89.0	47	1500	1.0	1	1						N				N
													2	90.0	M	D	1500	1.2																
													4	89.0	M	D	1500	1.2																
67	23	LIA 238	F	A	8.0	Y	+15	+15	13694	65	28.34	60	3	91.0	M	D	1600	0.8	90.0	45	1500	1.0	1	1						B	D	1500	0.8	N
													2	93.0	M	D	1700	1.0																
													4	91.0	M	D	1600	0.8																
108	5	LIA 238	F	A	8.0	Y	+15	+15	6941	71	29.99	50	3	87.0	M	D	1750	2.0	86.0	35	1700	2.0	3	1										N
													2	88.0	M	D	1850	1.4																
													4	86.0	M	P	1850	1.0																

VEHICLE DESCRIPTION / WEATHER

OBS NO	LAB NO	MODEL CODE	EMCT	TRANS	CR	AIR	SPARK ADVANCE AS RCD	SPARK ADVANCE AS TST	ODOM MILES	AMB TMP	BARO	HUM
132	6	LIA 238	F	A	8.0	Y	+15	+15	12119	87	29.62	118
142	6	LIA 238	F	A	8.0	Y	+14	+15	8175	85	30.00	103
209	4	LIA 238	F	A	8.0	Y	+15	+15	10054	76	29.13	96
256	7	LIA 238	F	A	8.0	Y	+15	+15	14756	72	29.68	47
288	47	LIA 238	C	A	8.0	Y	+12	+15	15210	70	29.76	62
354	46	LIA 238	F	A	8.0	Y	+15	+15	5344	72	29.50	58
380	41	LIA 238	C	A	8.0	Y	+13	+15	6200	72	29.97	60
403	26	LIA 238	F	A	8.0	Y	+15	+15	46789	91	29.80	131

OCTANE NUMBER REQUIREMENT DATA / TANK FUEL INFORMATION

OBS NO	FUEL	MAXIMUM OCT NO	MAXIMUM THR	MAXIMUM GEAR	MAXIMUM RPM	MAXIMUM MV	50TH PERCENTILE TECH OCT NO	50TH PERCENTILE TECH MPH	50TH PERCENTILE TECH RPM	50TH PERCENTILE TECH MV	MODE	FUEL	OWNER KNOCK	OBJ	ARUN	OCT NO RES	OCT NO MOT	RATER NINT	RATER GEAR	RATER RPM	RATER MV	RATER ARUN
132	3	95.0	P	D	1350	4.0	94.0	51	1850	2.4	1	1										
	2	97.0	P	D	1300	4.0																
	4	91.0	M	D	1700	2.0																
142	3	94.0	M	D	1600	1.8	93.0	50	2100	2.8	1	1										
	2	95.0	M	D	1500	1.8																
	4	94.0	M	D	1500	1.8																
209	3	87.0	M	D	1925	1.6	85.0	55	1775	1.9	3	1	N		N	91.2	82.8	N				N
	2	87.0	M	P	1800	1.2																
	4	87.0	M	P	1800	1.2																
256	3	94.0	M	D	1800	1.0	92.0	37	1500	3.0	3	1	Y	Y	Y	92.4	83.6	A	P	2400	1.4	N
	2	H	P	D	1700	6.0																
	4	92.0	M	P	2450	1.0																
288	3	93.0	P	D	1500	8.0	92.5	35	1400	1.5	1	1										
	2	95.0	P	D	1500	8.0																
	4	92.5	M	D	1350	1.2																
354	3	98.0	M	D	1900	1.0	93.0	45	2000	2.0	1	1						A	D	1800	1.0	
	2	98.0	M	D	1900	1.0																
	4	96.0	M	D	1900	1.0																
380	3	97.0	P	D	3000	5.5	87.0	42	1850	1.6	3	1						A	P	2350	1.0	N
	2	99.0	P	D	2950	5.5																
	4	87.0	M	D	1900	1.2																
403	3	92.0	M	D	1500	0.5	91.0	58	2000	2.0	1	1				92.2	82.8	A	D	1500	0.5	N
	2	95.0	M	D	1500	0.5																
	4	90.0	M	D	1575	0.5																

			VEHICLE DESCRIPTION								WEATHER		OCTANE NUMBER REQUIREMENT DATA												TANK FUEL INFORMATION									
							SPARK ADVANCE							MAXIMUM					50TH PERCENTILE TECH						OWNER					RATER				
OBS NO	LAB NO	MODEL CODE	EMCT	TRANS	CR	AIR	AS RCD	AS TST	ODOM MILES	AMB TMP	BARO	HUM	FUEL	OCT NO	THR	GEAR	RPM	MV	OCT NO	MPH	RPM	MV	MODE	FUEL	KNOCK	OBJ	ARUN	OCT NO RES	OCT NO MOT	NINT	GEAR	RPM	MV	ARUN
221	28	LA 238	F	A	8.0	Y	+15	+15	16370	75	29.41	91	3	87.0	M	D	2100	1.0	87.0	45	2400	1.0	2	1						N				N
													2	88.0	M	D	2100	1.0																
													4	82.0	M	D	1750	1.0																
95	3	LY 450	F	A	7.9	Y	+15	+15	12796	74	29.97	78	3	82.0	M	D	1900	1.5	82.0	40	1800	1.8	3	1										
													2	82.0	M	D	1900	1.5																
													4	80.0	M	D	2000	1.5																
109	5	LY 450	F	A	7.9	Y	+15	+15	10071	70	30.15	56	3	87.0	M	D	1550	2.5	84.0	35	1600	3.0	2	1	N		N	92.7	82.9	N				N
													2	87.0	M	D	1400	2.8																
													4	85.0	M	P	1750	0.8																
148	6	LY 450	F	A	7.9	Y	+18	+18	9400	78	30.17	67	3	92.0	P	D	1000	8.0	91.0	53	1350	2.0	1	1	N		N	92 1	83.4	N				N
													2	94.0	P	D	1000	8.0																
													4	88.0	M	D	2100	2.0																
225	28	LY 450	F	A	7.9	Y	+18	+18	8080	78	29.36	86	3	87.0	M	D	1900	1.5	86.0	55	1900	1.5	1	1						N				N
													2	87.0	M	D	1900	1.5																
													4	88.0	M	D	1900	1.5																
23	29	L4 441	F	A	8.0	Y	+15	+15	15108	70	29.98	64	3	H	M	D	1900	0.4	98.0	47	2000	0.9	2	1				92.4	84.0	A	D	1800	0.4	N
													2	H	M	D	2000	0.4																
													4	95.0	M	D	2000	0.4																
127	6	ML 216	F	A	8.8	Y	+10	+10	7645	87	29.99	120	3	92.0	M	D	1950	0.8	90.0	40	2100	2.0	1	1										
													2	93.0	M	D	2300	0.8																
													4	92.0	M	D	2100	0.8																
252	7	ML 216	F	A	8.8	Y	+ 8	+ 8	5693	72	30.36	43	3	92.0	M	D	2000	0.5	91.0	35	2000	1.5	3	1	N		N	95.6	86.5	B	D	2800	0.5	N
													2	94.0	M	D	2400	0.5																
													4	93.0	M	D	2100	0.5																

			VEHICLE DESCRIPTION							WEATHER			OCTANE NUMBER REQUIREMENT DATA										TANK FUEL INFORMATION											
														MAXIMUM					50TH PERCENTILE TECH				OWNER							RATER				
							SPARK ADVANCE																					OCT NO						
OBS NO	LAB NO	MODEL CODE	EMCT	TRNS	CR	AIR	AS RCD	AS TST	ODOM MILES	AMB TMP	BARO	HUM	FUEL	OCT NO	THR	GEAR	RPM	MV	OCT NO	MPH	RPM	MV	MODE	FUEL	KNOCK	OBJ	ARUN	RES	MOT	NINT	GEAR	RPM	MV	ARUN
281	47	ML 216	C	A	8.8	Y	+ 6	+ 6	10400	70	29.68	64	3	89.0	M	D	1600	0.5	88.0	45	2000	1.0	1	1										
													2	89.5	K	D	1650	0.5																
													4	88.5	M	D	1750	0.5																
6	40	ML 216M	F	M	8.8	N	+10	+10	10159	75	29.50	110	3	92.0	P	4	1300	2.0	89.0	45	1850	0.0	3	1	N		N	92.9	84.9	B	4	1500	0.0	N
													2	93.0	P	4	1300	2.0																
													4	93.0	M	4	1300	0.0																
228	28	ML 216M	F	M	8.8	Y	+10	+10	9281	78	29.35	71	3	90.0	M	4	1500	0.5	85.0	34	1900	0.8	1	1	N		N	92.1	83.2	N				N
													2	89.0	M	4	1500	0.5																
													4	89.0	M	4	1500	0.5																
310	32	ML 216M	F	M	8.8	Y	+14	+10	13073	85	29.44	66	3	93.0	M	4	1000	0.0	89.0	55	2400	0.2	1	1										
													2	93.0	M	4	1000	0.0																
													4	92.0	M	4	1100	0.0																
313	32	ML 216M	F	M	8.8	N	+13	+10	7665	85	29.56	68	3	94.0	M	4	1000	0.1	89.0	52	2400	0.3	1	1										
													2	94.0	M	4	1050	0.1																
													4	92.0	M	4	1200	0.1																
358	8	ML 216M	F	M	8.8	Y	+10	+10	8806	83	29.66	79	3	87.0	M	3	1750	0.9	85.0	30	2050	0.7	2	1	N		N			N				N
													2	88.0	M	3	1750	0.9																
													4	85.0	M	3	1800	0.9																
128	6	MCA 133	F	A	8.6	Y	+10	+10	13680	90	29.89	139	3	91.0	M	P	3000	2.1	90.0	50	2800	2.0	2	1										
													2	91.0	M	P	3200	2.1																
													4	89.0	M	P	2800	2.0																
311	32	MCA 133	F	A	8.6	Y	+12	+10	9855	85	29.69	67	3	94.0	M	D	2200	0.7	92.0	55	2400	1.5	2	1										
													2	94.0	M	P	2200	0.7																
													4	92.0	M	P	2300	0.7																

		VEHICLE DESCRIPTION								WEATHER			OCTANE NUMBER REQUIREMENT DATA	MAXIMUM					50TH PERCENTILE TECH						TANK FUEL INFORMATION OWNER					RATER			
OBS NO	LAB NO	MODEL CODE	EMCT	TRANS	CR	AIR	SPARK ADVANCE AS RCD	SPARK ADVANCE AS TST	ODOM MILES	AMB TMP	BARO	HUM	FUEL	OCT NO	THR	GEAR	RPM	MV	OCT NO	MPH	RPM	MV	MODEL	FUEL	KNOCK	OBJ	ARUN	OCT NO RES	OCT NO MOT	NINT	GEAR	RPM	MV	ARUN
266	7	MCA 223	F	A	9.0	Y	+ 8	+12	6710	73	30.37	64	3	89.0	M	P	3500	2.0	88.0	28	2000	3.5	1	1	N		N	92.5	83.3	B	P	3500	1.9	Y
													2	90.0	M	P	3100	1.9																
													4	88.0	M	P	3050	1.5																
139	6	MCB 133	F	A	8.6	Y	+ 8	+10	13930	82	30.09	85	3	99.0	M	P	2400	1.0	94.0	50	2000	1.0	2	1										
													2	100.0	M	P	2400	1.0																
													4	94.0	M	P	1700	1.2																
318	32	MCB 133	F	A	8.6	Y	+10	+10	11377	85	29.48	66	3	93.0	M	D	2200	0.5	92.0	55	2400	0.7	2	1	Y	Y	Y	90.9	83.0	B	D	2300	2.5	Y
													2	93.0	M	D	2000	0.5																
													4	90.5	M	D	2400	0.5																
324	46	MCB 133	F	A	8.6	Y	+12	+10	10664	72	29.50	66	3	90.5	M	P	3100	1.0	86.0	57	2800	1.5	3	1						N				
													2	90.5	M	P	3100	1.0																
													4	88.0	M	P	2700	1.0																
370	41	MCB 133	C	A	8.6	N	+10	+10	6500	70	29.90	88	3	90.0	M	D	2300	1.2	88.0	40	2350	2.2	3	1				92.3	82.5	B	D	2500	1.5	N
													2	91.0	M	D	2200	1.0																
													4	87.0	M	D	2200	1.0																
365	8	MCB 223	F	A	9.0	Y	+12	+12	7582	86	29.84	108	3	90.0	M	P	3550	0.8	92.0	58	3800	0.9	2	1	Y	N	N			B	P	3500	0.8	N
													2	92.0	M	P	3550	0.8																
													4	89.0	M	D	2450	2.9																
315	32	MCS 133	F	A	8.6	Y	+10	+10	12058	84	28.97	62	3	89.0	M	D	2300	0.6	88.0	58	2400	0.8	2	1	Y	N	N	91.0	83.7	N				N
													2	89.0	M	D	2200	0.6																
													4	87.0	M	D	2100	0.6																
306	32	MCS 133M	F	M	8.6	N	+ 6	+ 8	5051	85	29.29	68	3	96.0	M	4	800	0.0	91.0	40	1450	1.0	2	1										
													2	96.0	M	4	800	0.0																
													4	96.0	M	4	800	0.0																

OBS NO	LAB NO	MODEL CODE	EMCT	TRANS	CR	AIR	SPARK ADVANCE AS RCD	SPARK ADVANCE AS TST	ODOM MILES	AMB TMP	BARO	HUM	FUEL	MAXIMUM OCT NO	THR	GEAR	RPM	MV	50TH PERCENTILE TECH OCT NO	MPH	RPM	MV	MODE	FUEL	OWNER KNOCK	OBJ	ARUN	OCT NO RES	OCT NO MOT	RATER NIT	GEAR	RPM	MV	ARUN
137	6	MCS 223	F	A	9.0	Y	+12	+12	9223	82	30.09	85	3	92.0	M	D	2700	0.6	92.0	35	2200	1.0	3	1										
													2	94.0	M	P	3200	0.8																
													4	90.5	M	P	3000	0.8																
314	32	MCS 223	F	A	9.0	Y	+14	+12	19535	85	29.51	66	3	91.5	M	D	2900	0.6	93.0	53	2500	1.0	3	1										
													2	93.5	M	D	2900	0.6																
													4	91.0	M	D	2900	0.6																
361	8	MCS 223	F	A	9.0	Y	+12	+12	7610	80	30.02	64	3	94.0	M	D	2500	2.0	94.0	40	2350	3.5	3	1	Y	Y	N			B	P	3100	1.0	N
													2	95.0	M	D	2450	2.0																
													4	92.0	M	D	2500	2.0																
264	7	MCS 223M	F	M	9.0	N	+ 6	+ 6	5972	71	30.60	61	3	99.0	M	4	2600	1.0	96.0	43	2300	3.5	1	1	Y	Y	Y	92.0	83.2	A	3	2900	1.0	N
													2	H	M	4	2500	1.0																
													4	97.0	M	4	2750	1.0																
308	32	MCS 223M	F	M	9.0	Y	+ 8	+ 6	17458	85	29.40	64	3	93.0	M	4	1500	1.0	93.0	55	2500	0.5	1	1										
													2	93.0	M	4	2150	0.5																
													4	92.0	M	4	1550	0.5																
233	28	MI 242	F	A	8.2	Y	+10	+10	17039	70	29.44	75	3	91.5	M	D	1250	1.5	91.0	47	1600	2.5	1	1	Y	N	Y	92.5	83.1	B	D	1100	2.0	N
													2	92.0	M	D	1150	1.5																
													4	91.0	M	D	1200	1.5																
265	7	MI 242	F	A	8.2	Y	+10	+10	12181	70	30.59	60	3	95.0	M	D	2000	0.9	94.0	45	1800	4.0	3	1	Y	N	N	93.1	83.7	A	P	2300	1.0	N
													2	95.0	M	D	2200	0.9																
													4	93.0	M	P	2000	1.0																
304	32	MI 250	F	A	8.4	Y	+10	+10	10631	85	29.32	63	3	94.0	M	D	1250	2.5	93.0	47	1500	2.1	1	1	Y	N	N	91.6	82.7	A	D			N
													2	96.0	M	D	1400	2.5																
													4	94.0	M	D	1300	2.5																

			VEHICLE DESCRIPTION							WEATHER			OCTANE NUMBER REQUIREMENT DATA														TANK FUEL INFORMATION								
														MAXIMUM					50TH PERCENTILE TECH						OWNER					RATER				
							SPARK ADVANCE																											
OBS NO	LAB NO	MODEL CODE	EMCT	TRNS	CR	AIR	AS RCD	AS TST	ODOM MILES	AMB TMP	BARO	HUM	FUEL	OCT NO	THR	GEAR	RPM	MV	OCT NO	MPH	RPM	MV	MODE	FUEL	KNOCK	OBJ	ARUN	OCT NO RES	OCT NO MOT	NINT	GEAR	RPM	MV	ARUN
269	7	M V250	F	A	8.4	Y	+ 8	+ 8	7927	70	30.41	59	3	89.0	M	D	1350	0.9	88.0	27	1200	6.5	1	1	N		N	92 1	82 7	N				N
													2	90.0	M	D	1450	0.9																
													4	90.0	M	D	1350	0.9																
299	32	M V250	F	A	8.4	Y	+ 8	+ 8	6954	85	29.56	63	3	90.5	M	D	950	2.5	89.0	40	1150	2.0	1	1	Y	N	N	90.9	82.6	N				N
													2	90.5	M	D	1100	1.5																
													4	92.0	M	D	1000	2.5																
302	32	M V250	F	A	8.4	Y	+ 8	+ 8	10898	85	29.29	70	3	90.0	M	D	1300	3.0	85.5	32	1400	4.0	1	1	Y	N	N	91 0	82 6	A	D	1300	2 5	N
													2	91 0	M	D	1400	3 0																
													4	90.0	M	D	1-00	3.0																
69	23	NL9 216	F	A	8.6	Y	+18	+18	26140	70	28.98	90	3	90.0	P	D	2100	5.5	87.0	55	4700	1.0	1	1						N				N
													2	92.0	P	D	2100	6.5																
													4	87.0	M	P	2400	0.6																
77	23	NL9 216	F	A	8.6	Y	+18	+18	11203	70	27.76	110	3	87.0	M	P	2400	0.6	85.0	40	2800	1.0	3	1						N				N
													2	90.0	M	P	2400	0.6																
													4	87.0	M	P	2400	0 6																
140	6	NL9 216	F	A	8.6	Y	+18	+18	13390	81	30.21	76	3	98.0	P	D	2400	5.0	98.0	23	2300	6.0	1	1										
													2	99.0	P	D	2400	5.0																
													4	89.0	P	D	2500	5.0																
166	6	NL9 216	F	A	8.6	Y	+18	+18	14220	73	29.84	52	3	90.0	M	D	2400	0.6	90.0	35	2600	0.7	2	1										
													2	91.0	M	D	2400	0.6																
													4	89.0	M	D	2500	0.6																
201	4	NL9 216	F	A	8.6	Y	+20	+20	16580	72	29.30	49	3	88.0	M	D	2600	1.3	85.0	46	2750	2.0	3	1	N		N	91 2	83.5	B	D	2700	1.3	N
													2	90.0	M	D	2450	1 3																
													4	86.0	M	D	2700	1.3																

			VEHICLE DESCRIPTION							WEATHER			OCTANE NUMBER REQUIREMENT DATA															TANK FUEL INFORMATION						
														MAXIMUM					50TH PERCENTILE TECH						OWNER					RATER				
							SPARK ADVANCE																											
OBS NO	LAB NO	MODEL CODE	EMCT	TRANS	CR	AIR	AS RCD	AS TST	ODOM MILES	AMB TMP	BARO	HUM	FUEL	OCT NO	THR	GEAR	RPM	MV	OCT NO	MPH	RPM	MV	MODE	FUEL	KNOCK	OBJ	ARUN	OCT NO RES	OCT NO MOT	NINT	GEAR	RPM	MV	ARUN
267	7	NL9 216	F	A	8.6	Y	+22	+18	9354	71	29.99	61	3	94 0	M	D	2600	1.1	91.0	35	2500	6.0	3	1	N		N	93 0	84 0	A	D	2900	1 1	N
													2	96.0	M	D	3100	1.1																
													4	92.0	M	D	2700	1.1																
379	41	NL9 216	C	A	8.6	Y	+20	+20	6390	81	29.90	54	3	85.0	M	D	2500	1.0	84.0	45	2400	2.0	3	1						N				N
													2	88.0	M	D	2500	1.0																
													4	86.0	M	D	2700	1.0																
400	26	NL9 216	F	A	8.6	Y	+18	+18	7943	93	29.90	134	3	91.0	M	D	2700	0.8	91.0	35	2400	1.4	3	1				92.4	82 8	B	D	2900	0 8	N
													2	94.0	M	D	3450	0.8																
													4	88.5	M	P	2250	0.8																
28	29	NL9 216M	F	M	8.6	N	+18	+18	11435	70	30.04	57	3	96.0	M	4	1000	0.2	92.5	28	1600	1.8	1	1	Y	Y	N	92.2	83.7	A	4	1000	2 0	N
													2	97.0	M	4	1000	0.2																
													4	95.0	M	4	1000	0.2																
81	3	NL9 216M	F	M	8.6	N	+18	+18	6729	79	29.92	75	3	87.0	M	4	2000	0.2	86.0	40	2300	0.5	2	1										N
													2	86.0	M	4	2000	0.2																
													4	88.0	M	4	1500	0.2																
295	47	NL9 216M	C	M	8.6	N	+18	+18	12870	70	29.69	56	3	93.5	M	4	1750	0.0	93.5	35	1800	6.0	1	1										
													2	95.5	M	4	1750	0.0																
													4	93.5	M	4	1600	0 0																
335	46	NL9 216M	F	M	8.6	Y	+18	+18	14655	78	29.36	103	3	82.0	M	4	850	1.0	85.0	25	1200	1.0	3	1						N				
													2	82.0	M	4	850	1.0																
													4	82.0	M	4	850	1.0																
27	29	NCX 228	F	A	8.5	Y	+ 9	+ 9	8437	70	30.13	57	3	92.0	M	D	2000	1 8	86.0	44	2400	2.0	1	1	N		N			B	P	2150	1 0	N
													2	94.0	M	P	2100	1.0																
													4	88.0	M	D	1900	1.8																

VEHICLE DESCRIPTION										WEATHER			OCTANE NUMBER REQUIREMENT DATA										TANK FUEL INFORMATION												
														MAXIMUM					50TH PERCENTILE TECH				OWNER							RATER				
							SPARK ADVANCE																											
OBS NO	LAB NO	MODEL CODE	EMCT	TRANS	CR	AIR	AS RCD	AS TST	ODOM MILES	AMB TMP	BARO	HUM	FUEL	OCT NO	THR	GEAR	RPM	MV	OCT NO	MPH	RPM	MV	MODEL	FUEL	KNOCK	ODOR	ARUN	OCT NO RES	OCT NO MOT	NINT	GEAR	RPM	MV	ARUN
46	29	NCX 228	F	A	8.5	Y	+10	+10	10575	70	30.19	56	3	90.0	M	P	2200	1.0	87.0	38	2100	4.0	2	1				92.4	84.1	A	P	2200	1.0	N
													2	92.0	M	P	2200	1.0																
													4	89.0	M	P	2100	1.0																
56	23	NCX 228	F	A	8.5	Y	+ 8	+10	6096	70	27.94	76	3	84.0	M	D	2400	3.0	82.0	50	2500	2.0	1	1						N				N
													2	87.0	M	D	2400	3.0																
													4	85.0	M	D	2400	3.0																
63	23	NCX 228	F	A	8.5	Y	+10	+10	5810	64	27.98	71	3	85.0	M	P	2400	0.8	82.0	45	2400	1.5	1	1						N				N
													2	86.0	M	D	2300	1.0																
													4	85.0	M	P	2400	0.8																
160	6	NCX 228	F	A	8.5	Y	+ 8	+10	19280	84	30.00	156	3	90.0	M	D	2300	2.0	89.0	45	2300	2.0	3	1										
													2	93.0	M	D	2300	2.0																
													4	89.0	M	D	2300	2.0																
220	28	NCX 228	F	A	8.5	Y	+13	+10	17034	77	29.31	116	3	88.0	M	D	2150	3.2	87.0	37	2100	3.2	2	1	Y	Y	N	92.2	82.7	N				N
													2	90.0	M	D	2100	3.2																
													4	87.0	M	D	2200	3.2																
366	8	NCX 228	F	A	8.5	Y	+10	+10	12795	85	30.02	97	3	80.0	M	D	2300	3.0	78.0	50	3000	1.0	2	1	N		N			N				N
													2	82.0	M	D	2300	3.0																
													4	78.0	M	D	2400	2.5																
387	41	NCX 228	C	A	8.5	Y	+ 8	+10	12172	71	29.98	64	3	85.0	M	P	2400	1.8	79.0	50	2800	1.6	3	1						N				N
													2	86.0	M	P	2500	1.8																
													4	85.0	M	P	2500	1.8																
399	26	NCX 228	F	A	8.5	Y	+10	+10	6741	92	30.00	136	3	87.5	M	P	2050	0.7	87.0	51	2400	2.5	1	1				92.2	82.8	N				N
													2	90.0	M	D	2175	0.8																
													4	87.0	M	P	2250	0.7																

		VEHICLE DESCRIPTION								WEATHER			OCTANE NUMBER REQUIREMENT DATA												TANK FUEL INFORMATION									
							SPARK ADVANCE							MAXIMUM					50TH PERCENTILE TECH						OWNER					RATER				
OBS NO	LAB NO	MODEL CODE	EMCT	TRANS	CR	AIR	AS RCD	AS TST	ODOM MILES	AMB TMP	BARO	HUM	FUEL	OCT NO	THR	GEAR	RPM	MV	OCT NO	MPH	RPM	MV	MODE	FUEL	KNOCK	OBJ	ARUN	OCT NO RES	OCT NO MOT	NINT	GEAR	RPM	MV	ARUN
50	29	NC5 225	F	A	8.2	Y	+ 4	+ 4	9610	70	30.19	56	3	98.0	M	P	2000	0.6	97.0	40	2100	2.0	2	1				92.5	84.1	A	D	2200	0.8	N
													2	99 0	M	P	2000	0.6																
													4	93.0	M	P	2000	0.6																
74	23	NC5 225	F	A	8.2	N	+ 4	+ 4	7053	65	28.06	57	3	94.0	M	D	2500	0.8	94.0	50	2600	0.8	3	1						A	D	2400	0.8	N
													2	97.0	M	D	2500	0.8																
													4	91.0	M	D	2500	0.8																
78	23	NC5 225	F	A	8.2	Y	+ 5	+ 4	11120	75	28.00	102	3	94.0	M	D	2400	1.0	93.0	55	[illegible]	[illegible]	1	1						A	D	2400	1.0	N
													2	97.0	M	D	2400	1.0																
													4	91.0	M	P	1900	0.8																
263	7	NC5 225	F	A	8.2	Y	+ 4	+ 4	6200	71	30.47	61	3	95.0	M	P	3300	2.2	92.0	58	2600	2.5	3	1	Y	Y	N	91.4	83.6	A	P	2800	2.2	N
													2	98.0	M	P	3200	2.2																
													4	90.0	M	D	2550	2.4																
278	47	NC5 225	C	A	8.2	N	+ 4	+ 4	20100	70	29.74	62	3	H	M	D	2000	0.8	H	40	2000	0.8	3	1										
													2	H	M	D	2250	0.8																
													4	97.0	M	D	2300	0.8																
286	47	NC5 225	C	A	8.2	Y	+ 4	+ 4	12680	70	29.70	62	3	94.0	M	D	2150	0.5	92.5	60	2300	1.5	2	1										
													2	97.0	M	D	2300	0.5																
													4	91.0	M	D	2300	0.5																
174	6	NC5 225M	F	M	8.2	Y	+ 4	+ 4	13530	77	29.79	105	3	92.0	M	4	1800	0.6	92.0	50	1800	0.6	3	1	Y	N	N	95.3	85.3	N				N
													2	93.0	M	3	2300	0.4																
													4	92.0	M	4	1800	0.6																
45	29	NFH 450M	F	M	8.6	Y	+ 6	+ 5	8721	70	29.97	55	3	93.5	M	3	1900	1.5	92.0	38	1900	3.5	1	1	Y	N	N	92.5	84.0	A	4	1900	2.0	N
													2	95.0	M	3	2000	1.5																
													4	92.0	M	3	1900	1.5																

		VEHICLE DESCRIPTION								WEATHER			OCTANE NUMBER REQUIREMENT DATA											TANK FUEL INFORMATION										
														MAXIMUM					50TH PERCENTILE TECH					OWNER						RATER				
							SPARK ADVANCE																					OCT NO						
OBS NO	LAB NO	MODEL CODE	EMCT	TRANS	CR	AIR	AS RCD	AS TST	ODOM MILES	AMB TMP	BARO	HUM	FUEL	OCT NO	THR	GEAR	RPM	MV	OCT NO	MPH	RPM	MV	MODE	FUEL	KNOCK	OBJ	ARUN	RES	MOT	NINT	GEAR	RPM	MV	ARUN
213	23	NFL 457	F	A	8.2	Y	+ 4	+ 6	7440	75	28.20	74	3	88.0	P	D	1700	9.0	87.0	50	2000	9.0	2	1						N				N
													2	93.0	P	D	1700	8.0																
													4	86.0	M	D	1500	3.0																
273	47	NIA 238	C	A	8.0	Y	+15	+15	7150	70	29.77	50	3	99.0	P	D	1400	7.0	97.0	25	1200	6.0	3	1	Y	Y	N			A	D	1400	7.0	N
													2	101.0	P	D	1400	7.0																
													4	89.0	M	D	1650	0.8																
372	41	NIA 238	C	A	8.0	Y	+14	+14	8800	70	29.92	62	3	97.0	P	D	2900	5.6	90.0	55	2900	1.5	2	1						B	D	1800	6.0	N
													2	H	P	D	2900	5.6																
													4	89.0	M	D	1900	1.6																
350	46	NIH 450	F	A	8.6	Y	+ 4	+ 6	7467	72	29.28	67	3	86.0	M	D	1600	01.5	85.0	35	1400	3.5	1	1						N				
													2	86.0	M	D	1600	01.5																
													4	85.0	M	D	1450	01.5																
1	40	NIJ 244	F	A	8.3	Y	+ 6	+ 6	10284	75	29.34	102	3	93.0	P	D	1800	4.0	89.0	35	1850	2.0	1	1	N		N	92.9	84.9	N				N
													2	91.0	P	D	2100	4.0																
													4	90.0	M	D	1600	2.0																
34	29	NIK 238	F	A	8.6	Y	+ 6	+ 6	13104	70	29.98	62	3	95.0	P	D	1300	5.0	90.0	33	1850	3.4	1	1				92.4	83.9	B	D	1300	5.0	N
													2	98.0	P	D	1300	5.0																
													4	89.0	P	D	1300	5.0																
60	23	NIK 238	F	A	8.6	Y	+ 6	+ 6	14553	67	28.20	99	3	93.0	M	D	1400	4.0	90.0	35	2100	1.0	2	1						B	D	1300	4.0	N
													2	95.0	M	D	1400	4.0																
													4	90.0	M	D	1400	4.0																
65	23	NIK 238	F	A	8.6	Y	+ 5	+ 6	8971	60	28.20	36	3	95.0	P	D	1300	6.0	91.0	55	2800	1.2	1	1						B	D	1300	5.0	N
													2	97.0	P	D	1300	6.0																
													4	92.0	M	D	1600	0.8																

VEHICLE DESCRIPTION										WEATHER			OCTANE NUMBER REQUIREMENT DATA															TANK FUEL INFORMATION						
														MAXIMUM					50TH PERCENTILE TECH						OWNER					RATER				
							SPARK ADVANCE																											
OBS NO	LAB NO	MODEL CODE	EMCT	TRANS	CR	AIR	AS RCD	AS TST	ODOM MILES	AMB TMP	BARO	HUM	FUEL	OCT NO	THR	GEAR	RPM	MV	OCT NO	MPH	RPM	MV	MODEL	FUEL	KNOCK	ODOR	ARUN	OCT NO RES	OCT NO MOT	NOINT	GEAR	RPM	MV	ARUN
89	3	NIK 238	F	A	8.6	Y	+ 6	+ 6	8125	75	29.89	76	3	90.0	P	D	1600	6.0	86.0	30	1800	3.5	2	1	Y	N	Y	92.5	82.2	N				N
													2	91.5	P	D	1700	6.0																
													4	86.0	M	P	2400	1.0																
163	6	NIK 238	F	A	8.6	Y	+ 6	+ 6	9490	79	29.99	90	3	98.0	P	D	1800	7.0	90.0	35	1400	4.0	2	1	Y	Y	Y	91.7	82.5	A	D	1500	2.2	N
													2	98.0	P	D	1800	7.0																
													4	93.0	M	D	1700	2.5																
187	4	NIK 238	F	A	8.6	N	+ 6	+ 6	5594	78	29.33	67	3	94.0	M	P	3250	0.8	92.0	57	1800	4.5	1	1	N		Y	95.1	85.6	N				N
													2	95.0	P	D	1800	5.0																
													4	88.0	M	D	1750	1.1																
268	7	NIK 238	F	A	8.6	Y	+ 5	+ 6	8560	70	30.46	61	3	90.0	P	D	2150	4.0	88.0	55	2200	0.8	3	1	N		N	93.0	82.1	B	D	2100	0.6	N
													2	91.0	P	D	1800	4.0																
													4	89.0	M	D	2050	0.6																
359	8	NIK 238	F	A	8.6	Y	+ 6	+ 6	6884	80	29.71	83	3	86.0	M	D	1700	1.0	84.0	36	1700	1.8	3	1	N		N			N				N
													2	86.0	M	D	1700	1.0																
													4	87.0	M	D	1700	1.0																
405	26	NIK 238	F	A	8.6	Y	+ 6	+ 6	7865	99	29.90	86	3	95.0	P	D	1300	5.9	88.0	33	1600	0.8	3	1				92.2	82.9	A	D	1400	5.9	N
													2	95.0	P	D	1300	5.9																
													4	91.0	P	D	1250	5.9																
199	4	NS6 457	F	A	8.2	Y	+ 6	+ 6	6410	80	28.82	83	3	84.0	P	D	1300	3.0	82.0	38	1500	4.0	1	1	N		N	92.7	83.1	N				N
													2	86.0	M	D	1500	1.5																
													4	84.0	P	D	2150	3.0																
215	23	NH 450	F	A	8.6	Y	+ 5	+ 6	8681	42			3	94.0	M	P	2100	1.0	95.0	50	2200	6.0	2	1						A	D	1300	2.0	N
													2	96.0	M	P	2100	1.0																
													4	93.0	M	D	1400	2.0																

VEHICLE DESCRIPTION										WEATHER			OCTANE NUMBER REQUIREMENT DATA												TANK FUEL INFORMATION									
							SPARK ADVANCE							MAXIMUM					50TH PERCENTILE TECH						OWNER					RATER				
OBS NO	LAB NO	MODEL CODE	EMCT	TRNS	CR	AIR	AS RCD	AS TST	ODOM MILES	AMB TMP	BARO	HUM	FUEL	OCT NO	THR	GEAR	RPM	MV	OCT NO	MPH	RPM	MV	MODE	FUEL	KNOCK	OBJ	ARUN	OCT NO RES	OCT NO MOT	NINT	GEAR	RPM	MV	ARUN
223	28	NH 450	F	A	8.6	Y	+ 6	+ 6	12960	64	29.45	76	3	92.0	M	D	1000	1.5	91.0	56	1450	2.0	1	1						B	D	1000	1.5	N
													2	92.0	M	D	1000	1.5																
													4	91.0	M	D	1300	1.5																
224	28	NH 450	F	A	8.6	Y	+ 6	+ 6	12415	85	29.42	103	3	86.0	M	D	2550	1.5	87.0	34	1850	4.0	3	1	N		N	92.2	82.5	N				N
													2	91.0	M	D	2500	1.5																
													4	86.0	M	D	2300	1.5																
275	47	NH 450	C	A	8.6	Y	+ 6	+ 6	6000	70	29.65	56	3	91.0	P	D	1750	7.0	87.0	40	1800	3.0	1	1										
													2	93.0	P	D	1750	7.0																
													4	88.5	M	D	1900	1.0																
111	5	NJ 244	F	A	8.3	Y	+ 6	+ 6	5274	70	30.22	61	3	93.0	M	D	2150	3.0	90.0	38	2000	3.0	3	1	Y	N	N	93.0	82.8	B	D	2100	3.0	N
													2	93.0	M	D	2150	3.0																
													4	91.0	M	D	2150	3.0																
391	26	NJ 244	F	A	8.3	Y	+ 6	+ 6	6048	95	29.90	124	3	94.0	P	D	1550	6.0	92.0	32	975	5.5	2	1				92.3	82.8	A	D	1500	6.0	N
													2	96.0	P	D	1525	6.0																
													4	89.0	M	D	1100	2.3																
51	29	NK 238	F	A	8.6	Y	+ 6	+ 6	10360	70	30.11	58	3	93.0	M	P	1700	0.6	91.0	33	1700	1.0	2	1				92.6	83.7	A	D	1500	5.0	N
													2	98 0	P	D	1600	5.0																
													4	90.0	M	D	1700	0.6																
207	4	NK 238	F	A	8.6	Y	+ 6	+ 6	6449	82	29.12	107	3	85.0	M	D	1675	1.5	82.0	32	1700	1.5	2	1	N		N	91.9	82.4	N				N
													2	85.0	M	D	1650	1.5																
													4	84.0	M	D	1675	1.5																
4	40	OL 216	F	A	8.8	N	+10	+10	10029	73	29.45	80	3	95.0	M	D	1800	1.5	93.0	40	1900	2.0	3	1	N		N	92.9	84.9	A	D	1500	2.0	N
													2	95.0	M	D	1800	1 5																
													4	94.0	M	D	1800	2.0																

			VEHICLE DESCRIPTION							WEATHER			OCTANE NUMBER REQUIREMENT DATA												TANK FUEL INFORMATION									
														MAXIMUM					50TH PERCENTILE TECH						OWNER					RATER				
							SPARK ADVANCE																					OCT NO						
OBS NO	LAB NO	MODEL CODE	EMCT	TRANS	CR	AIR	AS RCD	AS TST	ODOM MILES	AMB TMP	BARO	HUM	FUEL	OCT NO	THR	GEAR	RPM	MV	OCT NO	MPH	RPM	MV	MODE	FUEL	KNOCK	OBJ	ARUN	RES	MOT	NINT	GEAR	RPM	MV	ARUN
12	22	OL 216	F	A	8.8	Y	+10	+10	9163	70	29.40	55	3	83.0	M	D	1400	2.0	83.0	42	2300	1.2	1	1						N				N
													2	83.0	M	D	1300	2.8																
													4	81.5	M	D	2250	1.0																
35	29	OL 216	F	A	8.8	Y	+10	+10	10340	70	30.13	57	3	91.5	M	D	1400	0.8	90.0	35	1600	1.0	2	1				91.9	83.8	B	D	1400	0.8	N
													2	94.0	M	D	1400	0.8																
													4	92.0	M	D	1400	0.8																
105	5	OL 216	F	A	8.8	N	+10	+10	5850	73	30.18	60	3	92.0	M	D	1950	1.0	90.0	45	2300	1.0	2	1										N
													2	93.0	M	D	2400	1.0																
													4	91.0	M	D	2050	1.0																
162	6	OL 216	F	A	8.8	Y	+10	+10	9850	79	29.99	90	3	97.0	M	D	1700	0.6	96.0	40	1900	0.7	1	1										
													2	98.0	M	D	1800	0.6																
													4	96.0	M	D	1800	0.6																
212	4	OL 216	F	A	8.8	Y	+10	+10	12485	77	29.11	54	3	89.0	M	D	1700	0.7	89.0	36	1700	1.0	1	1	N		N	90.4	84.5	N				N
													2	91.0	M	P	1950	0.7																
													4	89.0	M	D	1800	0.7																
227	28	OL 216	F	A	8.8	Y	+10	+10	8320	79	29.42	96	3	91.0	M	D	1800	1.5	90.0	40	1900	2.0	3	1						B	D	1650	1.5	N
													2	92.0	M	D	1700	1.5																
													4	89.0	M	D	1850	1.5																
312	32	OL 216	F	A	8.8	Y	+15	+10	11610	85	29.66	65	3	94.0	M	P	1700	0.9	93.5	48	2500	1.5	3	1										
													2	95.0	M	D	1800	0.6																
													4	93.0	M	D	1800	0.6																
383	41	OL 216	C	A	8.8	N	+ 9	+ 6	7500	82	29.96	66	3	92.0	M	D	1700	1.0	90.0	35	1750	1.0	3	1						B	D	1500	1.0	
													2	93.0	M	D	1500	1.0																
													4	92.0	M	D	1700	1.0																

OBS NO	LAB NO	MODEL CODE	EMCT	TRANS	CR	AIR	SPARK ADVANCE AS RCD	SPARK ADVANCE AS TST	ODOM MILES	AMB TMP	BARO	HUM	FUEL	MAXIMUM OCT NO	MAXIMUM THR	MAXIMUM GEAR	MAXIMUM RPM	MAXIMUM MV	50TH PERCENTILE TECH OCT NO	50TH PERCENTILE TECH MPH	50TH PERCENTILE TECH RPM	50TH PERCENTILE TECH MV	MODE	FUEL	OWNER KNOCK	OWNER OBJ	OWNER ARUN	OCT NO RES	OCT NO MOT	RATER NINT	RATER GEAR	RATER RPM	RATER MV	RATER ARUN
393	26	OL 216	F	A	8.8	Y	+10	+10	17710	88	30.02	133	3	94.0	M	D	1650	0.0	93.0	35	1625	0.5	2	1				92.2	83.0	A	D	1600	0.0	N
													2	96.0	M	D	1650	0.0																
													4	92.0	M	D	1700	0.0																
406	26	OL 216	F	A	8.8	Y	+10	+10	7310	88	29.93	122	3	97.0	M	D	1400	0.5	95.0	33	1550	0.6	2	1				92.3	82.8	A	D	1400	0.5	N
													2	97.0	M	D	1400	0.5																
													4	95.0	M	D	1500	0.5																
53	29	OL 216M	F	M	8.8	Y	+10	+10	12293	70	30.20	57	3	92.5	M	4	800	0.0	86.5	50	3200	1.2	3	1				92.1	84.0	A	4	800	0.0	N
													2	93.0	M	4	800	0.0																
													4	92.5	M	4	800	0.0																
80	3	OL 216M	F	M	8.8	N	+ 8	+10	8333	80	30.12	50	3	90.0	M	4	1600	0.2	90.5	40	1800	0.2	2	1										N
													2	92.0	M	4	1600	0.2																
													4	91.0	M	4	1500	0.2																
135	6	OL 216M	F	M	8.8	N	+10	+10	11195	83	29.81	89	3	92.0	M	4	1700	0.4	90.0	35	2500	0.4	1	1	Y	N	N	92.5	83.2	A	4	2500	0.4	N
													2	95.0	M	3	4000	0.4																
													4	91.0	M	4	2000	0.4																
204	4	OL 216M	F	M	8.8	N	+10	+10	6861	78	29.06	57	3	90.0	P	4	1300	2.0	86.0	38	2700	6.0	3	1	N		Y	90.7	83.4	B	4	1750	2.0	N
													2	91.0	P	4	1250	2.0																
													4	88.0	P	4	1350	2.0																
307	32	OL 216M	F	M	8.6	Y	+14	+10	8693	85	29.32	60	3	96.0	M	3	4200	0.7	94.0	60	4200	0.7	2	1										
													2	96.0	M	3	4200	0.7																
													4	91.0	M	4	1100	0.1																
320	32	OL 216M	F	M	8.8	Y	+10	+10	10243	85	29.73	62	3	94.0	M	4	1200	0.1	91.0	40	3000	2.0	1	1	Y	N	N	91.5	82.7	A	4	1200	0.4	N
													2	94.0	M	4	1100	0.1																
													4	96.0	M	4	1200	0.1																

OBS NO	LAB NO	MODEL CODE	EMCT	TRNS	CR	AIR	SPARK ADVANCE AS RCD	SPARK ADVANCE AS TST	ODOM MILES	AMB TMP	BARO	HUM	FUEL	MAXIMUM OCT NO	MAXIMUM THR	MAXIMUM GEAR	MAXIMUM RPM	MAXIMUM MV	50TH PERCENTILE TECH OCT NO	50TH PERCENTILE TECH MPH	50TH PERCENTILE TECH RPM	50TH PERCENTILE TECH MV	MODEL	FUEL	OWNER KNOCK	OWNER OBJ	OWNER ARUN	OCT NO RES	OCT NO MOT	RATER NINT	RATER GEAR	RATER RPM	RATER MV	RATER ARUN
328	46	DL 216M	F	M	8.8	Y	+10	+10	14888	78	29.41	120	3	88.0	M	4	1550	0.5	85.0	45	2000	0.5	3	1						N				
													2	86.0	M	4	1900	0.5																
													4	87.0	M	4	1450	0.5																
388	41	DL 216M	C	M	8.8	N	+ 7	+10	8079	71	29.99	63	3	92.0	M	4	1500	0.8	88.0	40	1750	1.0	3	1						A	4	1500	0.8	N
													2	92.0	M	4	1500	0.8																
													4	91.0	M	4	1500	0.8																
33	29	DCA 133	F	A	8.6	Y	+10	+10	13028	70	30.13	57	3	92.5	M	P	1500	0.4	90.5	33	1600	0.8	2	1						A	D	1400	0.4	N
													2	93.0	M	P	1400	0.4																
													4	92.0	M	P	1500	0.4																
130	6	DCA 133	F	A	8.6	Y	+10	+10	18576	87	29.77	124	3	89.0	M	P	2000	1.8	87.0	45	2200	2.0	2	1										
													2	89.0	M	P	2000	1.8																
													4	89.0	M	P	2000	1.8																
291	47	DCA 133	C	A	8.6	Y	+12	+10	6000	70	29.68	62	3	93.0	M	D	2000	0.8	91.5	50	2000	1.8	3	1										
													2	95.0	M	D	2000	0.8																
													4	89.0	M	P	1900	1.0																
316	32	DCA 133	F	A	8.6	Y	+12	+10	5386	85	29.26	68	3	88.0	M	D	2100	0.9	85.0	54	2300	1.0	3	1										
													2	88.0	M	D	2300	0.9																
													4	87.0	M	D	2050	0.9																
318	32	DCA 133	F	A	8.6	Y	+10	+10	9270	85	29.39	68	3	85.5	M	P	1950	0.7	84.5	45	2200	1.0	2	1	N		N	95.0	85 4	N				N
													2	87.0	M	D	2150	1.0																
													4	84.5	M	P	2000	0.8																
396	26	DCA 133	F	A	8.6	Y	+10	+10	15856	93	29.94	134	3	87.0	M	P	1900	0.9	84.0	40	1900	0.9	3	1				92.8	83.2	N				N
													2	89.0	M	P	1950	0.9																
													4	85.0	M	D	1800	0.9																

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														MAXIMUM					50TH PERCENTILE TECH						OWNER					RATER				
							SPARK ADVANCE																											
OBS NO	LAB NO	MODEL CODE	EMCT	TRANS	CR	AIR	AS RCD	AS TST	ODOM MILES	AMB TMP	BARO	HUM	FUEL	OCT NO	THR	GEAR	RPM	MV	OCT NO	MPH	RPM	MV	MODE	FUEL	KNOCK	OBJ	ARUN	OCT NO RES	OCT NO MOT	NINT	GEAR	RPM	MV	ARUN
106	5	OCA 223	F	A	9.0	Y	+ 9	+12	12726	70	30.08	56	3	87.0	M	D	2550	0.5	87.0	55	2600	0.6	1	1										Y
													2	88.5	M	D	2650	0.5																
													4	87.0	M	P	2550	0.5																
144	6	OCA 223	F	A	9.0	Y	+12	+12	12380	75	30.12	76	3	89.0	M	D	2700	1.6	90.0	50	2700	1 5	2	1										
													2	91.0	M	D	2800	1.4																
													4	90.0	M	D	2700	1.5																
211	4	OCA 223	F	A	9.0	Y	+12	+12	15450	75	29.22	81	3	91.0	M	D	2300	1.6	90.0	45	2600	1.6	2	1	Y	Y	N	90.4	84.5	B	D	2400	1.6	N
													2	92.0	M	D	2350	1.6																
													4	90.0	M	D	2300	1.6																
229	28	OCA 223	F	A	9.0	Y	+12	+12	11759	68	29.48	58	3	94.0	M	D	2400	1.3	94.0	50	3300	1.5	2	1						B	D	2650	1 5	Y
													2	94.0	M	D	2400	1.3																
													4	94.0	M	D	2600	1.3																
230	28	OCA 223	F	A	9.0	Y	+12	+12	12549	84	29.25	130	3	86.0	M	D	2700	1.2	86.0	53	2800	1.5	3	1						N				N
													2	88.0	M	D	2700	1.2																
													4	87.0	M	D	2700	1.2																
231	28	OCA 223	F	A	9.0	Y	+12	+12	12925	85	29.42	103	3	93.0	M	D	2500	1.5	91.0	56	2600	1.5	1	1						A	D	2600	1.5	N
													2	95.0	M	D	2600	1.5																
													4	91.0	M	D	2200	1.5																
317	32	OCA 223	F	A	9.0	Y	+13	+12	6922	85	29.09	62	3	94.5	M	D	2700	0.4	93.5	57	2800	0.6	3	1										
													2	96.5	M	D	2800	0.4																
													4	92.0	M	D	2600	0.4																
325	46	OCA 223	F	A	9.0	Y	+12	+12	8550	75	29.35	97	3	86.5	M	P	3150	1.0	85.0	53	2800	1.5	1	1						N				
													2	89.0	M	P	3550	1.0																
													4	86.5	M	P	2800	1.0																

OBS NO	LAB NO	MODEL CODE	EMCT	TRANS	CR	AIR	SPARK ADVANCE AS RCD	SPARK ADVANCE AS TST	ODOM MILES	AMB TMP	BARO	HUM	FUEL	MAXIMUM OCT NO	MAXIMUM THR	MAXIMUM GEAR	MAXIMUM RPM	MAXIMUM MV	50TH PERCENTILE TECH OCT NO	50TH PERCENTILE TECH MPH	50TH PERCENTILE TECH RPM	50TH PERCENTILE TECH MV	MODE	FUEL	OWNER KNOCK	OWNER OBJ	OWNER ARUN	OCT NO RES	OCT NO MOT	RATER NINT	RATER GEAR	RATER RPM	RATER MV	RATER ARUN
		VEHICLE DESCRIPTION								WEATHER			OCTANE NUMBER REQUIREMENT DATA												TANK FUEL INFORMATION									
326	46	OCA 223	F	A	9.0	Y	+12	+12	8760	75	29.08	91	3	88.0	M	P	3500	1.5	88.0	58	2600	2.0	1	1						A	P	3400	1.5	
													2	92.0	M	P	3650	1.5																
													4	88.5	M	P	2450	1.5																
327	46	OCA 223	F	A	9.0	Y	+12	+12	9759	78	29.53	57	3	89.0	M	D	2400	1.5	82.0	55	2900	2.0	3	1						B	D	1900	1.5	
													2	90.0	M	D	2150	1.5																
													4	88.0	M	D	2300	1.5																
329	46	OCA 223	F	A	9.0	Y	+12	+12	9684	76	29.73	78	3	87.0	M	D	2400	1.0	85.0	55	2600	2.0	3	1						N				
													2	87.0	M	D	2300	1.0																
													4	85.0	M	D	2400	1.0																
330	46	OCA 223	F	A	9.0	Y	+12	+12	8375	78	29.76	62	3	89.0	M	D	2600	1.5	86.0	50	2500	1.5	3	1						B	D	2700	1.5	
													2	90.0	M	D	2500	1.5																
													4	89.0	M	D	2450	1.5																
331	46	OCA 223	F	A	9.0	Y	+12	+12	8324	75	29.30	81	3	92.0	M	D	2450	1.5	92.0	55	2600	2.0	3	1						A	D	2550	1.5	
													2	92.5	M	D	2550	1.5																
													4	92.0	M	D	2450	1.5																
332	46	OCA 223	F	A	9.0	Y	+12	+12	8234	76	29.45	73	3	94.0	M	D	2600	01.5	86.0	45	2300	3.5	1	1						B	D	2600	1.5	
													2	94.0	M	D	2600	01.5																
													4	90.0	M	D	2600	01.5																
413	26	OCA 223	F	A	9.0	Y	+12	+12	12494	77	29.80	111	3	92.0	M	D	2700	1.0	91.0	51	2700	1.0	3	1				97.3	85.8	A	D	2650	1.0	N
													2	93.0	M	D	2600	1.0																
													4	91.5	M	D	2750	1.0																
25	29	OCB 133	F	A	8.6	Y	+10	+10	7483	70	30.24	59	3	92.5	M	D	1900	1.0	91.0	52	2200	1.0	2	1	Y	N	N	92.5	83.7	A	D	1800	1.0	N
													2	95.0	M	D	1900	1.0																
													4	89.0	M	D	1800	1.0																

			VEHICLE DESCRIPTION							WEATHER			OCTANE NUMBER REQUIREMENT DATA												TANK FUEL INFORMATION									
														MAXIMUM					50TH PERCENTILE TECH						OWNER					RATER				
							SPARK ADVANCE																											
OBS NO	LAB NO	MODEL CODE	EMCT	TRANS	CR	AIR	AS RCD	AS TST	ODOM MILES	AMB TMP	BARO	HUM	FUEL	OCT NO	THR	GEAR	RPM	MV	OCT NO	MPH	RPM	MV	MODE	FUEL	KNOCK	OBJ	ARUN	OCT NO RES	OCT NO MOT	NINT	GEAR	RPM	MV	ARUN
26	29	OCB 133	F	A	8.6	Y	+10	+10	9720	70	30.24	59	3	94.0	M	D	1800	1.0	93.0	53	2200	1.5	1	1						A	D	1700	1 0	N
													2	96.0	M	D	1700	1 0																
													4	91.5	M	D	1700	1.0																
210	4	OCB 133	F	A	8.6	Y	+10	+10	11608	77	29.25	92	3	88.0	M	D	1975	1 3	86.0	45	2100	3.1	2	1	N		N	92.1	83 3	N				N
													2	88.0	M	P	2000	1.3																
													4	87.0	M	P	1950	1.3																
165	6	OCB 223	F	A	9.0	Y	+12	+12	11960	73	29.84	52	3	91.0	M	D	2400	0.4	91.0	50	2700	0.4	1	1										
													2	93.5	M	D	2700	0.4																
													4	90.0	M	D	2700	0.4																
3	40	OCB 242	F	A	8.2	N	+10	+10	10038	75	29.52	82	3	87.0	M	D	1600	1 5	85.0	50	2000	3.5	3	1	N		N	92 9	84 9	N				N
													2	88.0	M	D	1600	1.5																
													4	88.0	M	D	1800	1.0																
90	3	OCS 133	F	A	8.6	Y	+10	+10	8105	75	29.77	51	3	88.0	M	D	2100	1.2	88.0	37	2000	1.5	3	1										N
													2	88.0	M	D	2100	1 2																
													4	86.0	M	D	2100	1.2																
300	32	OCS 223	F	A	9.0	Y	+15	+12	9452	85	29.40	80	3	88.0	M	D	2800	1.0	87.5	54	2900	1.0	2	1										
													2	89.0	M	D	2800	1.0																
													4																					
374	41	OCS 223	C	A	9.0	Y	+12	+12	21900	70	30.10	68	3	89.0	M	D	2500	2 0	89.0	45	2550	2 0	3	1				93 2	83 0	A	D	2800	2 0	N
													2	91.0	M	D	2400	2.0																
													4	88.0	M	D	2700	2.0																
96	3	OCS 223M	F	M	9.0	N	+ 4	+ 6	7181	70	29.98	45	3	97.0	M	4	1500	0.6	97.0	45	1700	0.6	3	1	Y	N	N	92 0	82.6	A	4	1400	0 6	N
													2	97.0	M	4	1500	0 6																
													4	97.0	M	4	1400	0.6																

	VEHICLE DESCRIPTION									WEATHER			OCTANE NUMBER REQUIREMENT DATA												TANK FUEL INFORMATION									
														MAXIMUM					50TH PERCENTILE TECH						OWNER					RATER				
							SPARK ADVANCE																											
OBS NO	LAB NO	MODEL CODE	EMCT	TRANS	CR	AIR	AS RCD	AS TST	ODOM MILES	AMB TMP	BARO	HUM	FUEL	OCT NO	THR	GEAR	RPM	MV	OCT NO	MPH	RPM	MV	MODE	FUEL	KNOCK	OBJ	ARUN	OCT NO RES	OCT NO MOT	NINT	GEAR	RPM	MV	ARUN
309	32	OCS 223M	F	M	9.0	N	+ 6	+ 6	20122	85	29.46	66	3	94.0	M	4	1400	0.3	91.0	54	2600	0.5	3	1	Y	N	Y	91.6	82.7	A	4	2000	0.6	N
													2	94.0	M	4	1500	0.3																
													4	94.0	M	4	1400	0.3																
107	5	01 242	F	A	8.2	Y	+10	+10	5576	72	29.90	49	3	92.0	M	D	1200	2.0	92.0	53	1300	2.0	1	1	N		N	93.8	83.3	B	P	1350	1.2	N
													2	93.0	M	D	1200	2.0																
													4	91.0	M	D	1100	2.0																
323	32	01 242	F	A	8.2	Y	+10	+10	7711	85	29.13	67	3	91.0	M	D	1850	1.5	91.0	45	1850	0.5	2	1	N		N	91.0	82.7	A	D	2000	2.0	N
													2	92.0	M	D	1800	1.5																
													4	91.0	M	D	1750	1.5																
232	28	0 V242	F	A	8.2	Y	+ 7	+ 7	13199	72	29.25	82	3	92.0	M	D	1650	1.5	93.0	47	1900	1.4	1	1						B	D	1400	1.5	N
													2	93.0	M	D	1600	1.5																
													4	91.0	M	D	1400	1.5																
153	6	0 V250	F	A	8.4	Y	+ 8	+ 8	14850	87	29.84	118	3	92.0	M	D	1400	0.6	93.0	45	1400	0.6	2	1										
													2	93.0	M	D	1300	0.5																
													4	92.0	M	D	1400	0.6																
177	6	0 V250	F	A	8.4	Y	+ 8	+ 8	12355	72	29.92	57	3	92.0	P	D	1350	3.0	91.0	42	1800	3.4	3	1						B	D	1700	3.0	N
													2	93.0	P	D	1700	3.0																
													4	92.0	P	D	1650	3.0																
303	32	0 V250	F	A	8.4	Y	+ 8	+ 8	19146	85	29.22	65	3	89.5	M	D	1100	2.5	89.5	45	1400	1.0	1	1	Y	N	N	91.0	82.6	N				N
													2	90.0	M	D	1200	2.0																
													4	89.0	M	D	1200	2.5																
305	32	0 V250	F	A	8.4	Y	+ 8	+ 8	14800	85	29.25	64	3	91.0	P	D	1100	3.0	90.0	40	1150	2.5	1	1	N		Y	91.6	82.7	B	D	1100	3.0	N
													2	92.0	P	D	1000	3.0																
													4	91.0	P	D	1000	3.0																

			VEHICLE DESCRIPTION							WEATHER			OCTANE NUMBER REQUIREMENT DATA												TANK FUEL INFORMATION									
														MAXIMUM					50TH PERCENTILE TECH						OWNER			RATER						
							SPARK ADVANCE																											
OBS NO	LAB NO	MODEL CODE	EMCT	TRANS	CR	AIR	AS RCD	AS TST	ODOM MILES	AMB TMP	BARO	HUM	FUEL	OCT NO	THR	GEAR	RPM	MV	OCT NO	MPH	RPM	MV	MODE	FUEL	KNOCK	OBJ	ARUN	OCT NO RES	OCT NO MOT	NINT	GEAR	RPM	MV	ARUN
397	26	O V250	F	A	8.4	Y	+ 8	+ 8	9470	101	29.94	121	3	90.5	P	D	1000	3 0	90 0	49	1300	3 0	2	1				92 3	82 9	A	D	1050	3 0	N
													2	91.5	P	D	1050	3 0																
													4	90.5	P	D	1000	3 0																
179	6	OW V258	F	A	8.3	Y	+10	+10	5330	85	29.88	103	3	90.0	M	D	1200	1.2	90 0	35	1300	2 0	3	1						N				N
													2	91.0	M	D	1200	1 2																
													4	90.0	M	D	1300	1.2																
16	22	PL 217	F	A	8.2	Y	+10	+10	16592	70	29.18	62	3	83.0	M	D	2250	0.9	84 5	34	2100	1 2	2	1						N				N
													2	86.0	M	D	2200	0 9																
													4	83.0	M	D	2200	0.9																
17	22	PL 217	F	A	8.2	Y	+10	+10	19328	70	29.12	61	3	87.5	M	D	2200	0 9	86 5	37	2050	1 2	2	1						N				N
													2	87.5	M	D	2200	0 9																
													4	85.0	M	D	2450	0.8																
40	29	PL 217	F	A	8.2	N	+10	+10	13092	70	30.10	55	3	87.0	M	P	2000	0.8	84 0	31	2100	1 2	1	1	N		N			N				N
													2	90.0	M	P	2000	0 8																
													4	84.0	M	P	1800	0 8																
86	3	PL 217	F	A	8.2	N	+10	+10	7083	73	29.98	85	3	L					L					1	N		N	92.2	82 6	N				N
													2	L																				
													4	L																				
143	6	PL 217	F	A	8.2	Y	+ 9	+10	17470	85	30.00	103	3	87 0	M	D	2100	1.0	87 0	35	2200	1 0	1	1										
													2	89 0	M	D	2200	1 0																
													4	86.0	M	P	2100	1 5																
149	6	PL 217	F	A	8.2	Y	+14	+10	20119	85	30.29	60	3	86 0	P	D	2300	5 0	85 0	35	2300	4 0	1	1										
													2	89.0	P	D	2000	5 0																
													4	84 0	P	D	2300	5 0																

						VEHICLE DESCRIPTION				WEATHER				OCTANE NUMBER REQUIREMENT DATA										TANK FUEL INFORMATION											
														MAXIMUM					50TH PERCENTILE TECH						OWNER				RATER					
							SPARK ADVANCE																						OCT NO						
OBS NO	LAB NO	MODEL CODE	EMCT	TRANS	CR	AIR	AS RCD	AS TST	ODOM MILES	AMB TMP	BARO	HUM	FUEL	OCT NO	THR	GEAR	RPM	MV	OCT NO	MPH	RPM	MV	MODE	FUEL	KNOCK	OBJ	ARUN	RES	MOT	NINT	GEAR	RPM	MV	ARUN
200	4	PL 217	F	A	8.2	Y	+10	+10	19692	79	29.31	70	3	85.0	M	P	2050	1.0	84.0	53	2850	1.5	3	1	N		Y	91.8	84.3	N				Y
													2	89.0	M	D	2600	1.5																
													4	82.0	M	P	2050	1.0																
364	8	PL 217	F	A	8.2	Y	+10	+10	7906	84	29.98	88	3	82.0	M	D	2200	0.9	80.0	30	2200	0.6	1	1	N		N			N				N
													2	84.0	M	D	2400	0.9																
													4	78.0	M	D	2350	0.6																
415	26	PL 217	F	A	8.2	Y	+10	+10	8816	71	30.15	67	3	90.0	M	D	2450	2.5	89.0	35	2250	1.5	3	1				92.3	82.6	B	D	2150	0.5	N
													2	93.0	M	D	2300	2.5																
													4	86.0	M	D	2450	0.3																
100	5	PL 217M	F	M	8.2	N	+12	+12	8858	72	29.92	62	3	88.0	P	4	1400	3.0	87.0	35	1900	3.0	2	1	N		N	94.9	86.5	N				N
													2	91.0	P	4	1500	3.0																
													4	87.0	M	4	1450	0.0																
255	7	PL 217M	F	M	8.2	N	+12	+12	9092	70	30.28	49	3	96.0	M	4	2475	0.6	95.0	37	2200	0.7	1	1										N
													2	96.0	M	4	2450	0.6																
													4	91.0	M	4	1700	0.6																
368	41	PL 222	C	A	8.5	Y	+ 8	+10	15681	66	30.06	70	3	87.0	M	D	2000	2.0	86.0	45	2000	2.0	3	1						N				N
													2	89.0	M	D	1900	2.0																
													4	85.0	M	D	2100	2.0																
13	22	PC 222	F	A	8.5	Y	+10	+10	12895	70	29.23	60	3	83.0	M	D	1800	1.1	81.0	38	2000	1.0	2	1						N				N
													2	84.5	M	D	2000	1.0																
													4	82.5	M	D	1700	1.0																
54	29	PC 222	F	A	8.5	Y	+10	+10	13244	70	30.02	56	3	94.0	M	D	2000	2.2	93.0	33	2100	2.8	2	1	Y	N	N	92.1	83.8	A	D	2100	2.2	N
													2	95.0	M	D	2100	2.2																
													4	91.5	M	D	1800	2.2																

														OCTANE NUMBER REQUIREMENT DATA: MAXIMUM					50TH PERCENTILE TECH					TANK FUEL INFORMATION: OWNER						RATER				
VEHICLE DESCRIPTION							SPARK ADVANCE			WEATHER																								
OBS NO	LAB NO	MODEL CODF	EMCT	T?ANS	CR	AIR	AS RCD	AS TST	ODOM MILES	AMB TMP	BARO	HUM	FUEL	OCT NO	THR	GEAR	RPM	MV	OCT NO	MPH	RPM	MV	MODE	FUEL	KNOCK	OBJ	ARUN	OCT NO RES	OCT NO MOT	NINT	GEAR	RPM	MV	ARUN
84	3	PC 222	F	A	8.5	Y	+10	+10	6770	80	29.92	96	3	L					L					1	N		N	92 1	82 8	N				N
													2	L																				
													4	L																				
101	5	PC 222	[illegible]	A	8.5	N	+10	+10	9712	72	29.77	58	3	82.0	M	D	2000	1 4	82.0	42	2000	1 5	1	1	N		Y	92 0	83.2	N				N
													2	84.0	M	P	2150	1.0																
													4	83.0	M	P	2000	1.0																
194	4	PC 222	F	A	8.5	Y	+10	+10	10164	78	28.75	67	3	80.0	M	P	2100	1.0	78.0	41	2000	1.0	2	1	N		N	90 4	84 5	N				N
													2	81 0	M	P	2150	1 0																
													4	80.0	M	P	1900	1.0																
249	7	PC 222	F	A	8.5	Y	+10	+10	12213	70	30.20	48	3	90.0	M	D	2250	1.2	88.0	45	2200	1.2	3	1	N		N	93 4	83.6	N				N
													2	91.0	M	D	2300	1.2																
													4	88.0	M	P	2550	0 6																
261	7	PC 222	F	A	8.5	Y	+ 8	+ 7	5743	70	29.92	60	3	88.0	M	D	2600	2.3	86.0	52	2400	2.7	1	1	Y	Y	N	91.8	83.7	B	D	2600	2 3	N
													2	91.0	M	P	[illegible]600	1 8																
													4	90.0	M	D	2650	2 3																
282	47	PC 222	C	A	8.5	Y	+10	+10	12850	70	29.61	64	3	88 0	M	D	2000	0.7	87.0	45	2000	1 0	1	1										
													2	91 0	M	D	2000	0 7																
													4	86 5	M	D	1950	0.7																
283	47	PC 222	C	A	8 5	Y	+12	+10	12450	70	29.74	60	3	90.5	M	D	2000	0.8	89.0	50	2000	1.0	1	1										
													2	93.5	M	D	2000	0.8																
													4	88.0	M	D	2000	0 8																
333	46	PC 222	F	A	8 5	Y	+10	+10	8845	76	29.70	56	3	84.0	M	D	2100	1.0	82.0	45	2200	1.0	2	1						N				
													2	84.5	M	D	2250	1 0																
													4	82.0	M	D	2200	1.0																

VEHICLE DESCRIPTION — WEATHER — OCTANE NUMBER REQUIREMENT DATA (MAXIMUM; 50TH PERCENTILE TECH) — TANK FUEL INFORMATION (OWNER; RATER)

OBS NO	LAB NO	MODEL CODE	EMCT	TRANS	CR	AIR	SPARK ADVANCE AS RCD	SPARK ADVANCE AS TST	ODOM MILES	AMB TMP	BARO	HUM	FUEL	MAXIMUM OCT NO	THR	GEAR	RPM	MV	50TH PERCENTILE TECH OCT NO	MPH	RPM	MV	MODE	FUEL	OWNER KNOCK	OCBU	ARUN	OCT NO RES	OCT NO MOT	RATER NINT	GEAR	RPM	MV	ARUN
337	46	PC 222	F	A	8.5	Y	+10	+10	8514	76	29.61	70	3	82.0	M	D	2300	1.0	79.0	35	1900	3.0	3	1						N				
													2	83.0	M	D	2200	1.0																
													4	83.0	M	D	2250	1.0																
338	46	PC 222	F	A	8.5	Y	+10	+10	8933	76	29.81	61	3	83.0	M	D	2400	1.0	L					1						N				
													2	84.0	M	D	2050	1.0																
													4	83.0	M	D	2000	1.0																
346	46	PC 222	F	A	8.5	Y	+10	+10	9146	76	29.18	101	3	84.0	M	D	2100	1.5						1										
													2	85.0	M	D	2000	1.5																
													4	82.0	M	D	2200	1.5																
347	46	PC 222	F	A	8.5	Y	+11	+11	8680	74	29.28	83	3	85.0	M	D	2000	1.0	80.0	25	1700	3.0	1	1						N				
													2	85.0	M	D	2000	1.0																
													4	84.0	M	D	1700	1.0																
356	46	PC 222	F	A	8.5	Y	+10	+10	8965	67	29.50	66	3	82.0	M	D	2300	1.5	78.0	35	1800	2.5	1	1						N				
													2	82.0	M	D	2300	1.5																
													4	80.0	M	D	2100	1.5																
357	8	PC 222	F	A	8.5	Y	+10	+10	10291	83	29.74	100	3	80.0	M	D	2250	1.5	78.0	38	2650	1.2	3	1	N		N			N				N
													2	80.0	M	D	2300	1.5																
													4	76.0	M	D	2400	1.5																
411	26	PC 222	F	A	8.5	Y	+10	+10	28458	86	30.00	139	3	88.0	M	D	1700	0.6	86.0	25	2000	1.5	3	1				97 0	85 5	8	D	2200	0 6	N
													2	91.0	M	D	2000	0.6																
													4	88.0	M	P	1950	0.6																
412	26	PC 222	F	A	8.5	Y	+10	+10	30109	80	29.90	136	3	88.0	M	D	1850	0.2	87.0	32	2000	1.2	3	1				97 1	85.5	N				N
													2	90 0	M	D	1850	0 2																
													4	87.0	M	D	1800	0.1																

			VEHICLE DESCRIPTION							WEATHER			OCTANE NUMBER REQUIREMENT DATA															TANK FUEL INFORMATION							
														MAXIMUM					50TH PERCENTILE TECH						OWNER					RATER				
							SPARK ADVANCE																					OCT NO						
OBS NO	LAB NO	MODEL CODE	EMCT	TRANS	CR	AIR	AS RCD	AS TST	ODOM MILES	AMB TMP	BARO	HUM	FUEL	OCT NO	THR	GEAR	RPM	MV	OCT NO	MPH	RPM	MV	MODE	FUEL	KNOCK	OBJ	ARUN	RES	MOT	NINT	GEAR	RPM	MV	ARUN
85	3	PC 226	F	A	8.2	Y	+ 9	+ 7	9728	79	29.92	92	3	87.0	M	D	1800	1.5	87.0	45	1900	1.5	3	1	N		N	92.0	82 8	N				N
													2	87.0	M	D	1900	1.5																
													4	85.0	M	D	1500	1.5																
102	5	PC 226	F	A	8.2	N	+10	+ 7	6823	70	29.93	61	3	87.0	M	P	2100	1.8	84.0	45	2100	2.8	1	1						N				N
													2	89.0	M	P	2200	1.8																
													4	86.0	M	P	2100	1.8																
239	28	PC 226	F	A	8.2	Y	+ 7	+ 7	11870	69	29.32	71	3	90.0	M	D	2800	1.7	86.0	50	2400	4.0	3	1	N		Y	92 7	83 4	N				Y
													2	91.0	M	D	2900	1.7																
													4	86.0	M	D	2900	1.7																
392	26	PC 226	F	A	8.2	Y	+ 7	+ 7	7500	80	29.88	124	3	93. .	M	D	2400	1.0	92.0	50	2450	1	1	1	1			92 6	82 6	A	D	2500	1 0	N
													2	95)	M	D	2450	1.0																
													4	90.0	M	D	2150	1.0																
99	3	RL 225M	F	M	8.3	N	+10	+10	7997	72	29.94	50	3	92.0	M	4	1300	0.3	91.0	40	2000	0.4	2	1	N		N	92.2	83 0	A	4	1200	0 3	N
													2	93.0	M	4	1300	0.3																
													4	91.0	M	4	1300	0.3																
129	6	RC 225	F	A	8.3	Y	+12	+12	18360	85	29.85	91	3	91.0	M	D	2600	1.4	91.0	51	2600	1.2	1	1										
													2	92.0	M	D	2500	1.4																
													4	89.0	M	D	2300	1.4																
208	4	RC 242	F	A	8.3	N	+ 5	+ 5	6800	79	29.03	101	3	86.0	M	D	1800	1.0	82.0	50	1800	3.6	1	1	N		N	91 7	83 4	N				N
													2	86.0	M	D	1800	1.0																
													4	85.0	M	D	1750	1.0																
240	28	RC 242	F	A	8.3	Y	+ 6	+ 6	12434	69	29.50	67	3	86.0	M	D	1750	1.5	86.0	45	1650	3.5	3	1						N				N
													2	87.0	M	D	1750	1.5																
													4	86.0	M	D	1700	1.5																

			VEHICLE DESCRIPTION								WEATHER			OCTANE NUMBER REQUIREMENT DATA											TANK FUEL INFORMATION											
														MAXIMUM					50TH PERCENTILE TECH						OWNER					RATER					
							SPARK ADVANCE																												
OBS NO	LAB NO	MODEL CODE	EMCT	TRANS	CR	AIR	AS RCD	AS TST	ODOM MILES	AMB TMP	BARO	HUM	FUEL	OCT NO	THR	GEAR	RPM	MV	OCT NO	MPH	RPM	MV	MODE	FUEL	KNOCK	DBJ	ARUN	OCT NO RES	OCT NO MOT	NINT	GEAR	RPM	MV	ARUN
241	28	RC 242	F	A	8.3	Y	+ 6	+ 6	17347	66	29.48	78	3	87.0	M	D	1600	1.5	86.0	48	1500	2.5	3	1	N		N	92.6	83.0	N				N
													2	87.0	M	D	1600	1.5																
													4	88.0	M	D	1600	1.5																
163	6	S F50	F	A	8.4	Y	+17	+17	9750	61	30.11	32	3	94.0	M	P	3050	1.0	93.0	32	1300	1.5	1	1										
													2	95.0	M	P	3200	1.0																
													4	94.0	M	D	1450	1.0																
301	32	S F50	F	A	8 4	Y	+20	+20	11795	85	29.12	83	3	92.0	M	P	1400	0.3	92.5	24	1100	1.0	1	1	Y	Y	N	91.3	83.0					
													2	97.0	M	P	3400	1.5																
													4	91.5	M	P	1500	0.0																
395	26	S F50	F	A	8.4	Y	+20	+20	7570	90	29.94	126	3	94.0	M	D	1000	0.4	91.5	32	1000	1.0	2	1				92.3	83.2	A	D	1100	0.4	N
													2	94.0	M	D	1000	0.4																
													4	92.0	M	D	1050	0.4																
32	29	KT 137M	F	M	8.4	N	+ 6	+ 6	12801	70	29.95	56	3	95.0	M	3	1700	1.0	91.0	35	1950	2.0	3	1	Y	N	N	93.5	85.8	A	3	1600	1.0	N
													2	96.0	M	3	1700	1.0																
													4	92.0	M	3	1700	1.0																
414	26	KV 252	F	A	8.5	Y	+16	+16	34380	87	30.00	124	3	93.0	M	P	1750	0.7	91.0	40	2200	1.5	3	1				96.4	85.6	A	P	1700	0.7	N
													2	95.0	M	P	1700	0.7																
													4	91.0	M	P	1700	0.7																
260	7	NTLD 241	F	A	8.3	N	+ 8	+10	7107	72	30.10	61	3	98.0	M	D	2250	2.2	95.0	55	2500	1.7	1	1	Y	Y	N	92.5	84.4	A	P	2200	2.3	N
													2	100.0	M	D	2050	2.2																
													4	93.0	M	P	2250	2.2																
76	23	NTLD 241M	F	M	8.3	Y	+10	+10	6000	76	28.29	57	3	94.0	M	2	2900	1.5	92.0	42	1500	0.5	3	1						A	2	2900	1.5	N
													2	97.0	M	2	2900	1.5																
													4	92.0	M	3	1100	0.5																

	VEHICLE DESCRIPTION									WEATHER			OCTANE NUMBER REQUIREMENT DATA										TANK FUEL INFORMATION											
														MAXIMUM					50TH PERCENTILE TECH						OWNER					RATER				
							SPARK ADVANCE																					OCT NO						
OBS NO	LAB NO	MODEL CODE	EMCT	TRANS	CR	AIR	AS RCD	AS TST	ODOM MILES	AMB TMP	BARO	HUM	FUEL	OCT NO	THR	GEAR	RPM	MV	OCT NO	MPH	RPM	MV	MODE	FUEL	KNOCK	DBJ	ARUN	RES	MOT	NINT	GEAR	RPM	MV	ARUN
352	46	NTLD 241M	F	M	8.3	N	+10	+10	15944	75	29.28	76	3	91.0	M	3	1300	1.0	86.0	35	1200	1.5	2	1						N				
													2	90.0	M	3	1225	1.0																
													4	90.0	M	3	1450	1.0																
58	23	NTLG 250	F	A	8.5	N	+ 8	+ 8	6013	66	28.16	50	3	98.0	P	D	1000	6.0	94.0	25	1000	4.5	1	1						A	D	900	2.8	N
													2	99.0	P	D	1000	6.0																
													4	95.0	M	D	900	2.8																
417	26	NTLG 250	F	A	8.5	Y	+ 6	+ 8	6594	81	30.07	88	3	99.0	P	D	1850	5.0	94.0	37	1175	1.8	2	1				96.0	85.1	A	D	1300	5.0	N
													2	101.0	P	D	1800	5.0																
													4	94.0	P	D	1175	5.0																
188	4	NTLH 450	F	A	8.6	Y	+ 5	+ 5	7722	69	29.30	33	3	92.0	M	D	2000	2.0	91.0	50	1800	3.1	3	1	N		N	96.3	85.9	N				N
													2	93.0	M	D	1900	2.0																
													4	90.0	M	P	2200	1.5																
122	5	NVLD 241	F	A	8.3	N	+ 8	+ 8	6935	71	30.02	50	3	98.0	M	P	3400	1.6	96.0	57	3400	1.5	2	1	N		N	91.5	82.4	A	D	2250	1.8	N
													2	98.0	M	P	3350	1.6																
													4	93.0	M	P	2000	1.6																
10	22	OT 149M	F	M	8.9	N	+ 6	+ 6	8543	73	29.89	70	3	86.0	M	4	1450	0.0	85.5	42	2700	4.0	1	1										N
													2	86.5	M	4	3000	0.3																
													4	86.0	M	4	1350	0.0																
198	4	OT 149M	F	M	8.9	Y	+ 6	+ 6	6832	72	28.94	86	3	91.0	M	4	825	0.6	91.0	35	1150	1.0	2	1	N		N	92.7	84.0	B	4	900	0.6	N
													2	91.0	M	4	850	0.6																
													4	91.0	M	4	850	0.6																
390	41	OT 149M	C	M	8.9	N	+ 6	+ 6	9800	66	30.02	62	3	97.0	M	4	800	2.0	96.0	50	1450	3.5	3	1	Y	N	N	91.6	82.9	A	4	750	2.0	N
													2	97.0	M	4	1100	2.0																
													4	96.0	M	4	1000	2.0																

			VEHICLE DESCRIPTION								WEATHER			OCTANE NUMBER REQUIREMENT DATA												TANK FUEL INFORMATION									
														MAXIMUM					50TH PERCENTILE TECH						OWNER					RATER				
OBS NO	LAB NO	MODEL CODE	EMCT	TRANS	CR	AIR	SPARK ADVANCE AS RCD	SPARK ADVANCE AS TST	ODOM MILES	AMB TMP	BARO	HUM	FUEL	OCT NO	THR	GEAR	RPM	MV	OCT NO	MPH	RPM	MV	MODE	FUEL	KNOCK	OBJ	ARUN	OCT NO RES	OCT NO MOT	NINT	GEAR	RPM	MV	ARUN
22	22	OT 250	F	A	8.4	Y	+ 8	+ 8	15746	70	29.33	50	3	88.5	M	D	1450	0.8	85.5	39	1500	1.1	2	1						N				N
													2	88.5	M	D	1450	0.8																
													4	91.0	M	D	1450	1.0																
123	5	OT 250	F	A	8.4	Y	+ 4	+ 8	5800	69	30.20	58	3	89.5	M	D	1400	1.5	88.0	25	1000	8.0	1	1										N
													2	91.0	P	D	1150	8 0																
													4	89.0	M	D	1375	1.5																
126	5	OV 149	F	A	8.9	Y	+10	+10	8616	72	30.13	58	3	92.0	M	P	2300	1.5	92.0	52	2000	2.4	1	1	N		N	92.0	83.6	A	D	1900	2.0	N
													2	93.0	M	D	1900	2.0																
													4	92.0	M	D	2100	2.0																
321	32	OV 149M	F	M	8.9	Y	+ 6	+ 6	15997	85	29.42	67	3	96.0	M	3	1300	0.5	94.0	45	1525	1.0	3	1	Y	Y	N	91.3	82.6	A	3	1300	3.0	N
													2	96.0	M	3	1300	0.5																
													4	96.0	M	3	1100	0.4																
322	32	OV 250M	F	M	8.4	Y	+ 8	+ 8	14010	85	29.55	64	3	99.0	M	4	800	0.8	93.0	35	1500	1.2	2	1	Y	Y	N	91.5	82.3	A				N
													2	99.0	M	4	800	0.8																
													4	99.5	M	4	750	0.8																
250	7	PV 452	F	A	8.5	Y	+ 8	+ 9	16679	70	29.98	47	3	82.0	M	P	2200	0.6	80.0	37	2000	2.5	3	1										N
													2	84.0	M	P	2100	0.6																
													4	81.0	M	D	2000	0.5																
180	6	AU F17M	C	M	8.0	N	- 3	- 3	9700	77	29.92	83	3	86.0	M	4	2400	0.2	85.0	50	2400	1.5	2	1	N		N	89.1	84 2	N				N
													2	87.0	M	4	2700	0 2																
													4	84.0	M	4	2550	0 2																
93	3	B F17M	F	M	8.2	N	0	0	8786	80	29.81	106	3	88.0	M	4	2200	1.0	88.0	35	2300	1.0	3	1	N		N	95.8	86.7	N				N
													2	89.0	M	4	2200	1.0																
													4	86.0	M	4	1800	1.0																

OBS NO	LAB NO	MODEL CODE	ENG MCT	TRANS	CR	AIR	SPARK ADVANCE AS RCD	SPARK ADVANCE AS TST	ODOM MILES	AMB TMP	BARO	HUM	FUEL	MAXIMUM OCT NO	MAXIMUM THR	MAXIMUM GEAR	MAXIMUM RPM	MAXIMUM MV	50TH PERCENTILE TECH OCT NO	50TH PERCENTILE TECH MPH	50TH PERCENTILE TECH RPM	50TH PERCENTILE TECH MV	MODE	FUEL	OWNER KNOCK	OWNER OBJ	OWNER ARUN	OCT NO RES	OCT NO MOT	RATER NINT	RATER GEAR	RATER RPM	RATER MV	RATER ARUN
184	6	B F17M	F	M	8.2	N	- 3	- 3	6000	70	29.80	70	3	87.0	M	4	2000	1.0	86.0	40	1900	1.0	2	1	N		N	91.7	83.9	N				N
													2	90.0	M	4	1900	1.0																
													4	85.0	M	4	2000	1.0																
121	5	CH 226	F	A	8.2	N	+ 7	+ 7	11265	69	30.02	54	3	85.5	M	P	2200	2.0	82.0	30	2200	2.8	1	1	N		N	92.1	82.9	N				N
													2	86.5	M	D	2150	2.4																
													4	86.0	M	P	2150	2.0																
377	41	CP 114M	C	M	8.8	N	+ 5	+ 5	6770	66	29.98	62	3	88.5	M	4	1950	0.7	87.0	42	2600	1.0	2	1						N				N
													2	90.0	M	4	2100	0.7																
													4	89.0	M	4	1950	0.7																
112	5	CP 216	F	A	8.5	Y	+ 2	+ 5	6977	71	29.92	68	3	87.0	M	D	2350	1.8	86.0	27	1950	2.0	1	1										N
													2	87.0	M	D	2400	1.8																
													4	87.0	M	P	2200	0.8																
293	47	CP 216	C	A	8.5	Y	+ 5	+ 5	6026	70	29.68	60	3	88.0	M	D	3100	1.0	88.0	57	3100	1.0	1	1						A	D	3000	1.0	N
													2	90.5	M	D	3100	1.0																
													4	87.0	M	D	2100	1.0																
133	6	CP 216M	F	M	8.5	N	+ 5	+ 5	9013	87	29.62	118	3	92.0	M	4	3200	1.0	92.0	55	3100	1.0	3	1	Y	N	N	92.8	82.8	A	4	3200	1.0	N
													2	94.0	M	4	3350	1.0																
													4	93.0	M	4	1700	1.0																
145	6	CS 226	F	A	8.2	Y	+ 7	+ 7	8430	75	30.12	76	3	90.0	M	D	2200	3.8	89.0	40	2500	4.0	1	1	N		N	95.0	85.3	N				N
													2	91.0	M	D	2100	3.8																
													4	89.0	M	D	2400	3.8																
382	41	E 212M	C	M	8.5	N	+ 7	+ 7	9187	72	30.02	64	3	90.0	M	4	1600	1.0	86.0	45	2700	1.5	3	1	N		N			N				N
													2	90.0	M	4	1700	0.8																
													4	90.0	M	4	1700	1.0																

						VEHICLE DESCRIPTION				WEATHER			OCTANE NUMBER REQUIREMENT DATA												TANK FUEL INFORMATION										
													MAXIMUM						50TH PERCENTILE TECH						OWNER						RATER				
							SPARK ADVANCE																						OCT NO						
OBS NO	LAB NO	MODEL CODE	EMCT	TRNS	CR	AIR	AS RCD	AS TST	ODOM MILES	AMB TMP	BARO	HUM	FUEL	OCT NO	THR	GEAR	RPM	MV	OCT NO	MPH	RPM	MV	MODE	FUEL	KNOCK	DBJ	ARUN	RES	MOT	NINT	GEAR	RPM	MV	ARUN
29	29	E 215	F	A	8.9	Y	+ 5	+ 5	10272	70	30.24	57	3	98.0	M	P	3000	2.0	95.5	30	3200	2.5	3	1						A	D	2000	2.0	N
													2	100.0	M	P	3200	2.0																
													4	93.0	M	P	2200	2.0																
30	29	E 215	F	A	8.9	Y	+ 5	+ 5	8373	70	30.24	57	3	92.0	M	D	2300	1.8	90.0	32	2300	2.2	1	1	Y	N	N	92.0	83.8	B	D	2300	1.8	N
													2	93.0	M	D	2200	1.8																
													4	87.0	M	D	2250	1.8																
157	6	E 215	F	A	8.9	Y	+ 5	+ 5	9400	80	29.76	78	3	H	M	D	3000	1.5	H	50	3100	1.5	2	1										
													2	H	M	D	3200	1.5																
													4	94.0	M	D	2200	1.5																
172	6	E 215	F	A	8.9	Y	+ 5	+ 5	10030	76	30.03	52	3	99.0	M	D	3500	3.5	98.0	55	3500	3.5	3	1						A	D	3500	3.4	N
													2	H	M	D	3500	3.5																
													4	91.0	M	D	3400	3.5																
402	26	E 215	F	A	8.9	Y	+ 5	+ 5	7091	90	30.01	132	3	93.0	M	D	3150	1.1	92.0	56	3150	1.1	2	1				92.2	83.0	A	D	2600	1.1	N
													2	96.0	M	D	2700	1.1																
													4	88.5	M	D	2150	1.1																
20	22	E 215M	F	M	8.9	N	+ 3	+ 5	6230	70	29.31	52	3	93.5	M	4	1100	0.3	87.5	40	2000	2.4	1	1						A	4	1100	0.3	N
													2	94.0	M	4	1050	0.3																
													4	93.5	M	4	1000	0.3																
98	3	E 215M	F	M	8.9	Y	+ 5	+ 5	6136	64	30.00	35	3	93.0	M	4	1700	1.2	92.0	43	2400	1.4	3	1	Y	Y	N	90.8	82.7	A	4	1700	1.2	
													2	93.0	M	4	1700	1.2																
													4	93.0	M	4	1700	1.2																
134	6	E 215M	F	M	8.9	N	+ 5	+ 5	12380	83	29.81	89	3	96.0	M	4	3100	1.8	96.0	52	3000	1.8	3	1	N		N	92.1	83.4	A	4	3000	1.8	N
													2	97.0	M	4	3100	1.8																
													4	94.0	M	4	2100	1.8																

		VEHICLE DESCRIPTION								WEATHER			OCTANE NUMBER REQUIREMENT DATA												TANK FUEL INFORMATION										
							SPARK ADVANCE							MAXIMUM					50TH PERCENTILE TECH						OWNER			OCT NO		RATER				
OBS NO	LAB NO	MODEL CODE	EMCT	TRNS	CR	AIR	AS RCD	AS TST	ODOM MILES	AMB TMP	BARO	HUM	FUEL	OCT NO	THR	GEAR	RPM	MV	OCT NO	MPH	RPM	MV	MODE	FUEL	KNOCK	OBJ	ARUN	RES	MOT	NINT	GEAR	RPM	MV	ARUN
182	6	E 215M	F	M	8.9	N	+ 5	+ 5	15859	61	29.94	43	3	93.0	M	4	3000	0.4	93.0	55	3000	0.6	2	1	N		N	92.2	83.2	A	4	3400	0.4	N
													2	95.0	M	4	2900	0.4																
													4	93.0	M	4	1800	0.4																
189	4	E 215M	F	M	8.9	N	+ 2	+ 5	11909	66	29.20	42	3	90.0	M	4	1300	0.5	88.0	32	2000	1.2	2	1	N		N	98.8	87.6	N				N
													2	91.0	M	4	1150	0.5																
													4	90.0	M	4	1450	0.5																
296	47	E 215M	C	M	8.9	N	+ 3	+ 5	17453	70	29.70	56	3	99.0	M	4	2750	0.5	97.0	55	2750	1.0	3	1										
													2	101.0	M	4	3000	0.5																
													4	98.0	M	4	2900	0.5																
244	28	E 220	F	A	8.5	Y	+ 6	+ 6	11775	74	29.31	79	3	87.0	M	D	2300	3.0	86.0	30	2100	3.0	1	1						N				N
													2	89.0	M	D	2300	3.0																
													4	87.0	M	D	2400	3.0																
243	28	E 220M	F	M	8.5	Y	+ 7	+ 6	12933	68	29.30	79	3	89.0	M	4	1500	1.2	89.0	42	2200	1.0	2	1						N				N
													2	90.0	M	4	1500	1.2																
													4	90.0	M	4	1800	1.2																
373	41	E 220M	C	M	8.5	N	+ 6	+ 6	10490	70	30.10	93	3	88.0	M	4	2000	2.0	87.0	35	1800	2.0	3	1						N				N
													2	90.0	M	4	1900	2.0																
													4	87.0	M	4	2200	2.0																
2	40	E F20	F	A	8.5	N	+ 8	+ 8	7610	72	29.86	77	3	86.0	M	D	2500	1.5	85.0	55	3000	1.0	1	1	N		N	92.9	84.9	N				N
													2	87.0	M	D	2500	1.5																
													4	88.0	M	D	2800	1.5																
15	22	E F20	F	A	8.5	Y	+ 6	+ 6	12503	70	29.27	60	3	86.5	M	D	2500	0.6	87.5	25	1900	4.6	1	1						N				N
													2	88.0	M	D	2550	0.6																
													4	87.5	M	D	2600	0.5																

OBS NO	LAB NO	MODEL CODE	EMCT	TRANS	CR	AIR	SPARK ADVANCE AS RCD	SPARK ADVANCE AS TST	ODOM MILES	WEATHER AMB TMP	WEATHER BARO	WEATHER HUM	FUEL	MAXIMUM OCT NO	MAXIMUM THR	MAXIMUM GEAR	MAXIMUM RPM	MAXIMUM MV	50TH PERCENTILE TECH OCT NO	50TH PERCENTILE TECH MPH	50TH PERCENTILE TECH RPM	50TH PERCENTILE TECH MV	MODE	FUEL	OWNER KNOCK	OWNER ODOR	ARUN	OCT NO RES	OCT NO MOT	RATER NINT	RATER GEAR	RATER RPM	RATER MV	ARUN
119	5	E F20M	F	M	8.5	Y	+ 3	+ 6	5022	70	30.15	52	3	92.0	P	4	1050	2.0	92.0	35	2600	4.0	1	1										N
													2	94.0	P	4	10'0	2.0																
													4	96.0	M	4	1100	0.0																
290	47	E F20M	C	M	8.5	Y	+ 8	+ 6	10305	70	29.82	60	3	97.0	P	4	2750	3.0	92.0	60	3000	0.5	2	1										
													2	97.0	P	4	2500	3.0																
													4	93.0	P	4	2750	3.0																
161	6	E F28M	F	M	8.8	Y	+ 8	+ 8	15010	84	30.00	156	3	88.0	M	4	1700	0.6	86.0	5	1000	5.0	1	1	N		N	93.0	83.4	N				N
													2	88.0	M	4	1700	0.6																
													4	89.0	M	4	1700	0.6																
258	7	E F28M	F	M	8.8	Y	+ 8	+ 8	9600	70	29.92	60	3	92.0	M	3	1200	0.3						1	N		N	92.5	83.5	N				N
													2	89.0	M	3	1300	0.3																
													4	96.0	M	3	1100	0.4																
39	29	J 313M	F	M	8.8	N	+ 6	+ 6	6824	70	30.02	56	3	87.0	M	3	2100	1.2	86.0	30	2000	1.5	1	1	N		N			N				N
													2	90.0	M	3	2100	1.2																
													4	86.0	M	3	2000	1.2																
279	47	J 313M	C	M	8.8	Y	+ 2	+ 2	6000	70	29.78	62	3	85.0	M	4	1750	0.8	83.0	40	2000	0.8	2	1										
													2	85.0	M	4	1750	0.8																
													4	85.0	M	4	1750	0.8																
381	41	J 313M	C	M	8.8	N	+ 2	+ 2	9720	71	29.90	60	3	86.0	M	4	1600	0.4	84.0	42	2600	1.0	3	1	N		N	93.2	83.0	N				N
													2	86.0	M	4	1700	0.6																
													4	87.0	M	4	1600	0.4																
141	6	J 315	F	A	8.8	Y	- 2	- 2	9457	81	30.21	76	3	85.0	M	D	2700	1.5	85.0	35	2500	3.1	3	1										
													2	88.0	M	D	3000	1.5																
													4	85.0	M	D	3000	1.5																

			VEHICLE DESCRIPTION								WEATHER			OCTANE NUMBER REQUIREMENT DATA										TANK FUEL INFORMATION											
														MAXIMUM					50TH PERCENTILE TECH				OWNER							RATER				
OBS NO	LAB NO	MODEL CODE	EMCT	TRNS	CR	AIR	SPARK ADVANCE AS RCD	SPARK ADVANCE AS TST	ODOM MILES	AMB TMP	BARO	HUM	FUEL	OCT NO	THR	GEAR	RPM	MV	OCT NO	MPH	RPM	MV	MODE	FUEL	KNOCK	OBJ	ARUN	OCT NO RES	OCT NO MOT	NINT	GEAR	RPM	MV	ARUN
87	3	J 315M	F	M	8.8	N	+ 4	+ 4	10643	75	30.02	81	3	82.C	M	4	1900	0.6	82.0	40	2500	1.0	3	1	N		N	92.2	81.8	N				N
													2	82.0	M	4	1900	0.6																
													4	82.0	M	4	1900	0.6																
196	4	J 315M	F	M	8.8	N	+10	+10	6982	79	29.00	60	3	94.0	M	3	1800	0.5	93.0	40	2000	1.8	2	1	Y	N	N	91.0	83.2	B	4	1600	0.4	N
													2	95.0	M	3	1800	0.5																
													4	93.0	M	3	1500	0.5																
48	29	J 318	F	A	8.8	Y	0	0	11777	70	30.04	58	3	H	M	P	2400	0.9	96.0	35	2600	2.2	1	1				92.6	84.0	A	P	2400	0.9	N
													2	H	M	P	2400	0.9																
													4	H	M	P	2400	0.9																
146	6	J 318	F	A	8.8	Y	- 2	0	15550	86	29.76	102	3	96.0	M	D	3300	1.8	96.0	45	3200	1.8	1	1	N		N	92.4	83.3	A	D	3500	1.8	N
													2	97.0	M	D	3300	1.8																
													4	96.0	M	D	3100	1.8																
82	3	J 318M	F	M	8.8	Y	0	0	6052	79	30.06	78	3	L					L					1	N		N	92.4	82.5	N				N
													2	L																				
													4	L																				
120	5	J 318M	F	M	8.8	Y	0	0	4816	70	30.15	52	3	85.0	M	4	1700	1.0	82.0	48	2950	1.8	2	1	N		N	92.2	83.4	N				N
													2	85.0	M	4	1700	1.0																
													4	84.0	M	4	1400	1.0																
168	6	J 318M	F	M	8.8	N	0	0	8040	75	30.03	48	3	82.0	M	4	2400	1.8	81.0	35	2500	2.2	2	1	N		N	92.4	83.2	N				N
													2	85.0	M	4	2400	1.8																
													4	82.0	M	4	2300	1.8																
242	28	J 318M	F	M	8.8	Y	0	0	17345	71	29.50	47	3	94.0	M	4	2900	1.5	91.0	55	3200	2.0	1	1	Y	N	N	92.2	83.4	B	4	2700	1.5	N
													2	94.0	M	4	2800	1.5																
													4	94.0	M	4	2700	1.5																

VEHICLE DESCRIPTION										WEATHER			OCTANE NUMBER REQUIREMENT DATA												TANK FUEL INFORMATION									
							SPARK ADVANCE							MAXIMUM					50TH PERCENTILE TECH						OWNER					RATER				
OBS NO	LAB NO	MODEL CODE	EMCT	TRANS	CR	AIR	AS RCD	AS TST	ODOM MILES	AMB TMP	BARO	HUM	FUEL	OCT NO	MTHR	GEAR	RPM	MV	OCT NO	MPH	RPM	MV	MODE	FUEL	KNOCK	OBJ	ARUN	OCT NO RES	OCT NO MOT	NINT	GEAR	RPM	MV	ARUN
259	7	J 318M	F	M	8.8	N	0	0	7190	70	29 78	44	3	92.0	M	4	2400	1.3	86.0	40	2650	2.1	1	1	N		N	91.2	83.7	A	4	2500	1.3	N
													2	92.0	M	3	2900	1 7																
													4	92.0	M	4	2400	1 3																
289	47	J 318M	C	M	8.8	Y	+ 2	0	14760	70	29.80	60	3	89.0	M	4	1500	1.0	88.5	40	2000	2.0	2	1										
													2	89.0	M	4	1550	1.0																
													4	89.0	M	4	1500	1.0																
181	6	Q 216M	F	M	9.0	Y	+ 8	+ 8	10005	62	29.90	46	3	94.0	M	4	1750	1.0	93.0	37	1800	1.0	2	1	N		N	92.2	83.4	A	4	1700	0.6	N
													2	94.0	M	3	3700	1.0																
													4	94.0	M	4	1600	1.0																
195	4	Q 216M	F	M	9.0	N	+ 8	+ 8	5804	86	29.14	49	3	89.0	M	4	3475	0.5	88.0	59	3000	2.5	1	1	N		N	92.4	82 9	B	4	3375	0 5	N
													2	91 0	M	4	3450	0.5																
													4	89 0	M	4	1400	0 5																
8	40	Q 218M	F	M	8.7	N	+ 8	+ 8	7376	86	29.32	140	3	88.0	M	4	3200	2 0	87 0	55	2800	2.0	3	1	N		N			N				N
													2	90.0	M	4	3200	2 0																
													4	89.0	M	4	2200	2 0																
19	22	Q 218M	B	M	8.7	N	+ 8	+ 8	6490	70	29.16	60	3	89.0	M	4	1200	0 4	84.5	35	2200	0.7	1	1						N				N
													2	89.0	M	4	1350	0 4																
													4	87 5	M	4	1000	1 6																
41	29	Q 218M	F	M	8.7	Y	+10	+10	9549	70	30.02	56	3	86.0	M	4	2700	1 8	87 0	35	2900	2.0	2	1	N		N			N				N
													2	90.0	M	4	2600	1.8																
													4	85.0	M	4	2500	1.8																
176	6	Q 218M	F	M	8.7	N	+ 8	+ 8	6250	72	29 75	63	3	94 0	M	3	3400	1 0	93.0	55	2800	1.8	1	1	N		N	92.0	83 0	A	4	2500	1 0	N
													2	96.0	M	3	4000	0 8																
													4	91 0	M	4	2300	0 8																

OBS NO	LAB NO	MODEL CODE	E M C T	T R A N S	CR	A I R	SPARK ADVANCE AS RCD	SPARK ADVANCE AS TST	ODOM MILES	AMB TMP	BARO	HUM	F U E L	MAXIMUM OCT NO	T H R	G E A R	RPM	MV	50TH PERCENTILE TECH OCT NO	M P H	RPM	MV	M O D E L	F U E L	OWNER K N O C K	OWNER O B J	A R U N	OCT NO RES	OCT NO MOT	RATER N I N T	RATER G E A R	RPM	MV	A R U N
186	4	T 213M	F	M	9.0	N	+ 8	+ 8	12337	68	29.39	43	3	84.0	M	3	1550	0 4	82 0	55	2700	0.8	3	1	N		N	91 9	82 9	N				N
													2	85.0	M	3	1750	0 4																
													4	86.0	M	3	1800	0 4																
277	47	T 213M	C	M	9.0	Y	+10	+ 8	6010	70	29.74	54	3	84.0	M	4	2000	0 2	83.0	55	2250	0 2	1	1										
													2	84.0	M	4	2450	0 2																
													4	84 0	M	4	2100	0.2																
367	8	T 213M	F	M	9.0	N	+20	+ 8	6950	80	30.00		3	84.0	M	3	2700	0 8	85.0	40	2800	0 8	3	1	Y	Y	N	92 0	83.0	N				N
													2	88.0	M	3	2950	0.9																
													4	86.0	M	3	2700	0.9																
36	29	T 215	F	A	9.0	N	+ 5	+ 5	11163	70	30.10	59	3	90.0	M	P	2100	1.0	85.0	47	3100	2.2	2	1						N				N
													2	91.0	M	P	3600	1 0																
													4	89.0	M	P	2100	1.0																
158	6	T 215	F	A	9.0	Y	+10	+ 5	13730	88	30 10	98	3	86.0	M	D	3200	1.5	86.0	45	3000	1.5	2	1										
													2	89.0	M	D	3200	1 5																
													4	87.0	M	D	3100	1.5																
272	47	T 215	C	A	9.0	Y	+ 5	+ 5	6900	70	29.70	50	3	81.0	M	D	2500	1 0	80.0	40	2500	2 0	2	1										
													2	83.0	M	D	2350	1.0																
													4	81.0	M	D	2500	1.0																
9	40	T 215M	F	M	9 0	N	+ 5	+ 5	5409	66	29.50	82	3	89.0	M	4	1600	1.0	87.0	35	1750	1.5	3	1	N		N	92.9	84 9	N				N
													2	89 0	M	4	1600	1.0																
													4	90 0	M	4	1600	1.0																
155	6	T 215M	F	M	9 0	Y	+ 5	+ 5	9130	82	29.87	85	3	93 0	M	4	1800	0.4	92.0	40	2000	0.5	2	1	N		N	92.3	83 4	A	4	1800	0 4	N
													2	94.0	M	4	1800	0 4																
													4	94.0	M	4	1700	0 4																

VEHICLE DESCRIPTION OBS NO	LAB NO	MODEL CODE	EMCT	TRANS	CR	AIR	SPARK ADVANCE AS RCD	SPARK ADVANCE AS TST	ODOM MILES	WEATHER AMB TMP	BARO	HUM	OCTANE NUMBER REQUIREMENT DATA FUEL	MAXIMUM OCT NO	THR	GEAR	RPM	MV	50TH PERCENTILE TECH OCT NO	MPH	RPM	MV	MODE	TANK FUEL INFORMATION FUEL	OWNER KNOCK	OBJ	ARUN	OCT NO RES	OCT NO MOT	RATER NINT	GEAR	RPM	MV	ARUN
334	46	T 215M	F	M	9.0	Y	+ 5	+ 5	8532	80	29.68	94	3	89.0	M	4	1900	1.0	80 0	25	1700	3.0	1	1						N				
													2	89.0	M	4	1850	1 0																
													4	89 0	M	4	1700	1.0																
389	41	T 215M	C	M	9.0	N	+ 7	+ 5	8250	71	29.98	60	3	89.0	M	4	1600	0.6	83.0	45	2550	1 2	3	1	Y	N	N	91 7	82 8	N				N
													2	89.0	M	4	1600	0.6																
													4	89.0	M	4	1550	0.6																
11	22	T 218	F	A	[illegible] O	Y	+ 7	+ 7	7935	70	29.31	50	3	83.0	M	D	2500	1 4	81 0	42	2800	1.5	2	1						N				N
													2	83.0	M	D	2900	1.4																
													4	81.5	M	D	2800	1 4																
43	29	T 218	F	A	9.0	Y	+ 7	+ 7	14050	70	30.24	57	3	92.0	M	P	2100	1 0	87 5	35	2300	2.0	3	1						N				N
													2	94 0	M	P	2100	1.0																
													4	92.0	M	D	2350	1.0																
44	29	T 218	F	A	9.0	Y	+ 8	+ 8	12051	70	30.24	57	3	91.0	M	P	2300	1 0	88.0	33	2300	2 0	1	1	N		N	92 [illegible]	[illegible]	[illegible]				
													2	94.0	M	P	2200	1.0																
													4	88.0	M	P	2300	1.0																
136	6	T 218	F	A	9.0	Y	+ 7	+ 7	22520	83	29.81	89	3	90 0	M	P	2650	2.2	90 0	30	2500	2 4	1	1	N		N	9[illegible]	[illegible]					
													2	92.0	M	D	2600	1 8																
													4	89 0	M	P	2500	1 6																
205	4	T 218	F	A	9.0	Y	+ 4	+ 7	7276	81	28.89	77	3	88 0	M	P	2200	1 9	84 0	29	2050	2 8	[illegible]	[illegible]	N		N	[illegible]	[illegible]					
													2	88 0	M	P	2350	1 9																
													4	88 0	M	P	2450	1 9																
216	28	T 218	F	A	9.0	Y	+ 8	+ 8	22045	54	29.42	40	3	89 0	M	P	2500	1 8	87 0	40	245[illegible]	[illegible]												
													2	90.0	M	D	2600	1 8																
													4	88 0	M	D	2475	1 8																

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1981 CRC OCTANE NUMBER REQUIREMENT SURVEY.(U)
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			VEHICLE DESCRIPTION							WEATHER			OCTANE NUMBER REQUIREMENT DATA												TANK FUEL INFORMATION										
							SPARK ADVANCE							MAXIMUM					50TH PERCENTILE TECH						OWNER					RATER				
OBS NO	LAB NO	MODEL CODE	EMCT	TRANS	CR	AIR	AS RCD	AS TST	ODOM MILES	AMB TMP	BARO	HUM	FUEL	OCT NO	THR	GEAR	RPM	MV	OCT NO	MPH	RPM	MV	MODE	FUEL	KNOCK	ODOR	ARUN	OCT NO RES	OCT NO MOT	NIT	GEAR	RPM	MV	ARUN
248	28	T 218	F	A	9.0	Y	+ 7	+ 7	22192	53	29.42	35	3	89.0	M	P	2400	1.5	88.0	40	2200	2.0	2	1						N				N
													2	92.0	M	P	2900	1.5																
													4	89.0	M	P	2300	1.5																
408	26	T 218	F	A	9.0	Y	+ 7	+ 7	6194	85	30.23	48	3	93.0	M	P	3850	0.7	92.0	56	4200	0.8	3	1				92.4	82.8	A	P	3400	0.7	N
													2	94.0	M	P	4400	0.7																
													4	89.0	M	P	2200	0.7																
88	3	T 218M	F	M	9.0	Y	+ 7	+ 7	7251	80	29.82	98	3	91.0	M	4	1700	1.4	90.0	30	1800	1.5	2	1	N		N	91.9	82.6	N				N
													2	91.0	M	4	1700	1.4																
													4	90.0	M	4	1700	1.4																
117	5	T 218M	F	M	9.0	Y	+ 7	+ 7	8533	71	29.69	59	3	88.0	M	4	1450	1.0	87.0	35	1900	1.5	2	1	N		N	92.2	83.3	N				N
													2	88.0	M	4	1700	1.1																
													4	86.0	M	4	1450	1.0																
131	6	T 218M	F	M	9.0	Y	+ 7	+ 7	11550	82	29.64	70	3	94.0	M	4	2200	1.2	93.0	50	2600	1.4	1	1	N		N	95.1	84.6	A	4	2500	1.2	N
													2	95.0	M	4	2600	1.4																
													4	94.0	M	4	2200	1.4																
257	7	T 218M	F	M	9.0	N	+ 7	+ 7	10633	71	30.10	42	3	93.0	M	4	2100	1.4	90.0	40	2000	3.0	3	1	N		N	91.3	82.8	A	3	1800	1.6	N
													2	96.0	M	4	2500	1.3																
													4	92.0	M	4	2200	1.4																
280	47	T 218M	C	M	9.0	Y	+ 8	+ 8	15200	70	29.61	96	3	89.0	M	4	1750	0.0	89.0	35	2000	0.0	2	1										
													2	90.0	M	4	1750	0.0																
													4	88.0	M	4	1650	0.0																
386	41	T 218M	C	M	9.0	N	+ 7	+ 7	10840	70	29.94	62	3	88.0	M	4	1700	0.8	83.0	47	2600	1.5	3	1						B	4	1700	0.8	N
													2	89.0	M	4	1750	0.8																
													4	89.0	M	4	1700	0.8																

	VEHICLE DESCRIPTION										WEATHER			OCTANE NUMBER REQUIREMENT DATA												TANK FUEL INFORMATION									
														MAXIMUM					80TH PERCENTILE TECH						OWNER					RATER				
							SPARK ADVANCE																					OCT NO						
OBS NO	LAB NO	MODEL CODE	EMCT	TRANS	CR	AIR	AS RCD	AS TST	ODOM MILES	AMB TMP	BARO	HUM	FUEL	OCT NO	THR	GEAR	RPM	MV	OCT NO	MPH	RPM	MV	MODE	FUEL	KNOCK	OBJ	ARUN	RES	MOT	NOINT	GEAR	RPM	MV	ARUN
152	6	T 224	F	A	9.0	Y	+ 6	+ 8	9140	87	29.98	106	3	87.0	N	D	2800	2.0	86.0	40	2700	2.0	2	1										
													2	90.0	N	D	2800	2.0																
													4	88.0	N	P	2800	1.0																
169	6	T 224	F	A	9.0	Y	+ 8	+ 6	15880	74	30.07	78	3	89.0	N	D	2500	1.0	86.0	45	2700	1.5	1	1										
													2	90.0	N	D	2800	1.0																
													4	88.0	N	D	2800	1.0																
246	28	T 224	F	A	9.0	Y	+ 8	+ 8	12341	76	29.34	112	3	88.0	N	D	2800	1.0	88.0	58	3000	2.0	2	1						N				N
													2	88.0	N	D	2800	1.0																
													4	88.0	N	D	2800	1.0																
247	28	T 224	F	A	9.0	Y	+ 8	+ 8	16884	85	29.48	121	3	88.0	N	D	2800	2.0	87.0	27	3400	7.0	3	1	N		Y	94.0	83.8	N				N
													2	88.0	N	D	2800	2.0																
													4	86.0	N	D	2800	2.0																
118	5	T 224M	F	M	9.0	Y	+ 8	+ 8	7206	70	30.02	96	3	88.0	P	4	1150	2.0	87.0	40	1800	0.5	2	1	N		N	92.5	84.1	A	4	1200	0.0	N
													2	88.0	P	4	1150	2.0																
													4	89.0	P	4	1100	2.0																
206	4	T 224M	F	M	9.0	Y	+ 8	+ 8	8685	87	29.01	77	3	90.0	M	4	1250	0.6	88.0	38	1700	1.0	2	1	N		N	91.8	83.1	B	4	1450	0.6	N
													2	91.0	M	4	1250	0.6																
													4	91.0	M	4	1150	0.6																
245	26	T 224M	F	M	9.0	Y	+ 9	- 9	13290	75	29.31	106	3	88.0	M	4	2850	1.0	88.0	48	1850	1.0	3	1						N				N
													2	90.0	M	4	3100	1.0																
													4	91.0	M	4	1800	1.0																
287	47	T 224M	C	M	9.0	Y	+ 5	+ 8	8650	70	29.88	94	3	88.0	M	4	1250	0.5	84.0	40	1300	4.0	2	1										
													2	88.0	M	4	1250	0.5																
													4	88.0	M	4	1300	0.5																

		VEHICLE DESCRIPTION								WEATHER			OCTANE NUMBER REQUIREMENT DATA												TANK FUEL INFORMATION										
														MAXIMUM					50TH PERCENTILE TECH						OWNER					RATER				
							SPARK ADVANCE																											
OBS NO	LAB NO	MODEL CODE	ENG CT	TRANS	CR	AIR	AS RCD	AS TST	ODOM MILES	AMB TMP	BARO	HUM	FUEL	OCT NO	TH R	GEAR	RPM	MV	OCT NO	MPH	RPM	MV	MODE	FUEL	KNOCK	OBJ	ARUN	OCT NO RES	OCT NO MOT	N INT	GEAR	RPM	MV	ARUN
385	41	T 224M	C	M	9.0	Y	+8	+8	8546	61	29.92	56	3	91.0	M	4	1900	1.0	87.0	45	2150	2.5	2	1						N				N
													2	92.0	M	4	2000	1.0																
													4	91.0	M	4	1900	1.0																
147	6	V F21	F	A	9.3	Y	+8	+8	9393	86	29.76	102	3	88.0	M	D	2500	1.8	87.0	45	2800	1.8	1	1										
													2	88.0	M	D	2500	1.8																
													4	88.0	M	D	2400	1.8																
36	29	V F28M	F	M	8.6	Y	+6	+8	11533	70	29.98	60	3	90.0	M	3	1700	0.2	89.0	30	1900	0.2	1	1	N		N	92.3	84.0	8	3	1500	0.2	N
													2	93.0	M	3	1600	0.2																
													4	89.0	M	3	1650	0.2																
21	22	Y 214M	F	M	8.8	N	+3	+3	5292	70	29.32	51	3	89.5	M	4	1100	0.0	84.5	38	2200	2.2	2	1						N				N
													2	90.0	M	4	1050	0.0																
													4	89.5	M	4	1100	0.0																
5	40	Z 215	F	A	9.0	N	+8	+8	13508	73	29.46	95	3	83.0	M	D	2250	1.5	84.0	40	2100	1.5	3	1	N		N	92.9	84.9	N				N
													2	86.0	M	D	2550	1.5																
													4	85.0	M	D	2550	1.5																
19	22	Z 215M	F	M	9.0	N	+6	+8	7392	70	29.12	62	3	85.5	M	4	1400	0.4	81.0	30	2300	2.4	1	1						N				N
													2	85.5	M	4	1400	0.4																
													4	86.0	M	4	1400	0.4																
186	6	Z 215M	F	M	9.0	Y	+9	+8	5630	63	29.57	36	3	88.0	M	4	1800	0.6	87.0	35	1900	0.7	2	1	N		N	94.0	83.7	N				N
													2	88.0	M	4	1800	0.6																
													4	88.0	M	4	1800	0.6																
262	7	Z 215M	F	M	9.0	N	+8	+8	25173	72	30.18	44	3	90.0	M	4	2400	1.4	90.0	39	2200	2.0	2	1	Y	Y	N	91.8	83.2	N				N
													2	92.0	M	4	2400	1.4																
													4	89.0	M	4	2400	1.4																

OBS NO	LAB NO	MODEL CODE	VEHICLE DESCRIPTION EMCT	TRANS	CR	AIR	SPARK ADVANCE AS RCD	SPARK ADVANCE AS TST	ODOM MILES	WEATHER AMB TMP	BARO	HUM	FUEL	MAXIMUM OCT NO	THR	GEAR	RPM	MV	50TH PERCENTILE TECH OCT NO	MPH	RPM	MV	MODE	FUEL	OWNER KNOCK	OBJ	ARUN	OCT NO RES	OCT NO MOT	RATER NINT	GEAR	RPM	MV	ARUN
297	47	Z 215M	C	M	9.0	Y	+ 8	+ 8	9200	70	29.80	64	3	84.5	M	4	1800	0.0	83.0	40	2000	0.5	1	1	N		N							
													2	86.0	M	4	1650	0.0																
													4	83.0	M	4	1750	0.0																
369	41	Z 215M	C	M	9.0	N	+ 8	+ 8	6460	71	30.00	64	3	90.0	M	4	1600	0.5	86.0	45	2450	1.4	3	1	N		N	92.6	82.7	B	4	1550	0.5	N
													2	91.0	M	4	1600	0.5																
													4	92.0	M	4	1600	0.5																
292	47	CRT 220	C	A	6.6	Y	+ 6	+ 6	14810	70	29.60	57	3	97.0	M	P	3500	2.0	84.5	45	3000	4.0	1	1										
													2	100.0	M	P	3500	2.0																
													4	87.5	M	P	3000	2.0																
125	5	CRT 220M	F	M	8.6	N	+ 5	+ 8	12068	69	29.98	46	3	97.0	M	4	900	0.5	94.0	48	1950	1.0	1	1										N
													2	96.0	M	4	950	0.5																
													4	98.0	M	4	1000	0.5																
124	5	ET 222M	F	M	8.5	Y	+ 3	+ 5	10410	70	30.11	52	3	96.0	M	4	1150	0.8	95.0	8	1100	9.0	1	1										N
													2	97.0	M	4	1150	0.8																
													4	97.0	M	4	1100	0.8																
31	29	TT 224M	F	M	9.0	N	+ 6	+ 6	5294	70	30.11	56	3	92.0	M	4	1100	0.2	88.0	35	1600	1.2	2	1						A	4	1000	2.0	N
													2	94.0	P	4	1000	2.0																
													4	93.0	M	4	1100	0.2																
97	3	TT 224M	F	M	9.0	N	+ 8	+ 8	6773	63	29.95	52	3	90.0	M	4	1700	0.5	87.0	48	2300	0.9	1	1	N		N	94.5	84.9	B	4	1600	0.5	N
													2	91.0	M	4	1700	0.5																
													4	91.0	M	4	1700	0.5																
375	41	TT 224M	C	M	9.0	N	+ 8	+ 8	6025	64	29.90	55	3	91.0	M	4	2700	1.0	89.0	45	2325	1.0	3	1	Y	Y	N	97.2	86.4	N				N
													2	92.0	M	4	2750	1.0																
													4	90.0	M	4	2100	1.0																

			VEHICLE DESCRIPTION							WEATHER			OCTANE NUMBER REQUIREMENT DATA											TANK FUEL INFORMATION										
														MAXIMUM					50TH PERCENTILE TECH						OWNER					RATER				
							SPARK ADVANCE																					OCT NO						
OBS NO	LAB NO	MODEL CODE	ENCT	TRANS	CR	AIR	AS RCD	AS TST	ODOM MILES	AMB TMP	BARO	HUM	FUEL	OCT NO	THR	GEAR	RPM	MV	OCT NO	MPH	RPM	MV	MODE	FUEL	KNOCK	OBJ	ARUN	RES	MOT	NINT	GEAR	RPM	MV	ARUN
37	29	YUT 218M	F	M	8.5	N	+ 6	+ 6	11422	70	29.95	57	3	88.5	M	4	1800	1.5	88.0	26	1850	2.0	1	1	N		N			N				N
													2	92.0	M	4	1800	1.5																
													4	87.0	M	4	1800	1.5																
800	5	NL9 216	F	A	8.6	N	+18	+18	3976	70	29.88	48	3	90.0	M	P	2900	1.2	89.0	23	2200	6.0	1	1	N		N	94.0	83.3	A	P	2700	1.2	N
													2	92.0	P	D	2200	8.0																
													4	88.0	M	P	2500	1.2																
801	8	IIA 238	F	A	8.0	Y	+15	+15	3703	85	29.73	75	3	89.0	M	D	1800	1.0	89.0	40	1700	1.2		1	N		N			N				
													2	90.0	M	D	1750	1.0																
													4	90.0	M	D	1750	1.0																
802	8	LIA 238	F	A	8.0	Y	+15	+15	3764	95	29.61	105	3	89.0	M	D	1600	2.5	86.0	40	1700	1.0	2	1	N		N			N				N
													2	90.0	M	D	1550	2.5																
													4	88.0	M	D	1450	2.5																
803	8	BA F17	F	A	8.2	Y	+ 7	+ 7	2311	85	29.74	76	3	80.0	M	D	2450	1.2	78.0	40	2200	1.4	3	1	N		N			N				N
													2	82.0	M	D	2450	1.2																
													4	78.0	M	D	2700	1.0																
804	8	T 218	F	A	9.0	Y	+ 7	+ 7	3289	84	29.84	88	3	87.0	M	P	3900	1.7	86.0	50	3800	1.8	1	1	N		N			N				N
													2	87.0	M	P	3900	1.7																
													4	86.0	M	D	2550	2.0																
805	26	0 V250	F	A	8.4	Y	+ 8	+ 8	10747	99	30.08	124	3	92.0	P	D	975	3.0	91.5	26	1200	3.0	1	1				92.3	82.9	A	D	1000	3.0	N
													2	92.5	P	D	1050	3.0																
													4	92.5	P	D	950	3.0																

A P P E N D I X F

PROCEDURES FOR PLOTTING
OCTANE NUMBER REQUIREMENT DISTRIBUTION DATA

WEIGHTED VEHICLE/CAR POPULATIONS

Weighting factors for each vehicle model were developed from information supplied by the U.S. Vehicle Manufacturers and from information published (Ward's Automotive Reports) for imported vehicles. These weight factors were proportioned to the relative production and/or sales volumes of the vehicles tested.

For any vehicle having octane requirements lower (L) than the lowest octane number fuel available within a given fuel series, a number 0.5 Research/0.4 Motor lower was assigned. Similarly, for any vehicle having octane requirements higher (H) than the highest octane fuel available within a given fuel series, a number 0.5 Research/0.4 Motor higher was assigned.

The weighting factors of each vehicle model were divided by the number of vehicles tested to calculate individual vehicle weight factors. The octane requirements for each vehicle were then arranged in increasing order with the appropriate individual weighting factors. The percent of vehicles at each octane requirement level represents the summation of all vehicle weighting factors before that level, plus one-half the sum of the weighting factors at that level. The individual vehicle weighting factors are adjusted so that the summation of all weighting factors is 100.00 for any vehicle population of interest. The midpoint percentiles are plotted versus octane number requirement on arithmetic probability paper and a distribution curve is drawn through the points. These distributions are then plotted point to point on Cartesian coordinates for figures shown in the survey report.

SELECT CAR MODELS

For individual car models, the octane number requirement distribution curves were plotted by the "Z" method as described in "Statistical Estimation of the Gasoline Octane Number Requirement of New Model Automobiles," C. S. Brinegar and R. R. Miller, Technometrics, Vol. 2, No. 1, February 1960.

The procedure is as follows:

For any cars having octane requirements lower (L) than the lowest octane number fuel available within a given fuel level, a number 0.5 Research/ 0.4 Motor lower was assigned. Similarly, for individual cars having octane requirements higher (H) than the highest octane fuel available within a given fuel series a number 0.5 Research/0.4 Motor higher was assigned.

Using all observed and estimated octane number values, calculate the mean ($\bar{X}$) and the standard deviation (S) from the data for each car model.

1.
$$\bar{X} = \frac{\Sigma X_i}{n}$$

$$s = \sqrt{\frac{1}{n-1}\left[\Sigma X_i^2 - \left(\frac{\Sigma X_i}{n}\right)^2\right]}$$

Where X_i = Octane number requirement of the i^{th} car of a given model

n = Number of cars of that model.

2. Estimate octane number requirements at the percentiles of interest from octane number requirement distribution data by

$$O.N. = \overline{X} + ks$$

where k is selected from normal distribution tables.

Values of k used to calculate percentiles in this report are:

Percentile	k
5	-1.645
10	-1.282
20	-0.842
30	-0.524
40	-0.253
50	0
60	+0.253
70	+0.524
80	+0.842
90	+1.282
95	+1.645

The requirements were arranged in increasing order and plotted on arithmetic probability paper; the percent satisfaction for any car is calculated by the following relationship:

$$\text{Percent satisfied: } i^{th} \text{ car} = \frac{(i-0.5)}{N} \quad 100$$

where N is the total number of cars tested for a given fuel and i is an integer having increasing values from 1 to N.

Curves may either be faired through the plotted points or a straight line superimposed using the mean and standard deviation calculated above. From inspection of these curves, revised L and H values may be indicated. If so, new means and standard deviations may be calculated.

APPENDIX G

CONFIDENCE LIMITS OF OCTANE NUMBER REQUIREMENT DISTRIBUTIONS

CONFIDENCE LIMITS OF OCTANE NUMBER REQUIREMENT DISTRIBUTIONS

Octane number requirements of vehicles presented in this survey are determined at the levels that satisfy certain percentages of specific vehicle populations. In many cases, the recorded octane number requirement is followed by a plus and minus limit, referred to as the confidence interval. These limits give the interval within which the requirement for that satisfaction level would be expected 95% of the time in replicate testing.

At the 50% satisfaction level, the 95% confidence interval is calculated as follows:

$$CI = \pm ts/\sqrt{n}$$

where t = Students t at the proper number of degrees of freedom*

s = Standard deviation, calculated directly from the data or estimated as the difference between the 84.16th and 50th percentiles (assuming normal distribution)

n = Number of vehicles in population.

At other satisfaction levels:

$$CI = \pm ts\sqrt{1/n + k^2/[2(n-1)]}$$

At the 90% satisfaction level, k = 1.2817. For other satisfaction levels, appropriate values for k may be found in the standard statistical tables.

* Distribution of t for probability = 0.05.

Degrees of Freedom**	t	Degrees of Freedom	t
1	12.706	18	2.101
2	4.393	19	2.093
3	3.182	20	1.086
4	2.776	21	2.080
5	2.571	22	2.074
6	2.447	23	2.069
7	2.365	24	2.064
8	2.306	25	2.060
9	2.262	26	2.056
10	2.228	27	2.052
11	2.201	28	2.048
12	2.179	29	2.045
13	2.160	30	2.042
14	2.145	40	2.021
15	2.131	60	2.000
16	2.120	120	1.980
17	2.110	∞	1.960

** D.F = (n-1)

TABLE G-I

95% CONFIDENCE LIMITS FOR MAXIMUM REQUIREMENTS

1981 Weighted Vehicle Population Groups

Population	Fuel	n	t	Std. Dev. (S) RON	Std. Dev. (S) MON	Confidence Limits 50%	Confidence Limits %	Confidence Limits MON 50%	Confidence Limits MON 90%
US and Imported Vehicles	PR	416	1.966	3.44	3.44	0.33	0.45	0.33	0.45
	FBRU	417	1.966	4.37	2.47	0.42	0.57	0.24	0.32
	FBRSU	417	1.966	4.94	3.36	0.48	0.64	0.32	0.44
US and Imported Cars	PR	391	1.966	3.50	3.50	0.35	0.47	0.35	0.47
	FBRU	392	1.966	4.40	2.44	0.44	0.59	0.24	0.33
	FBRSU	392	1.966	4.99	3.38	0.50	0.67	0.34	0.45
US Vehicles	PR	317	1.968	3.01	3.01	0.33	0.45	0.33	0.45
	FBRU	318	1.968	3.91	2.25	0.43	0.58	0.25	0.34
	FBRSU	318	1.968	4.59	3.13	0.51	0.68	0.34	0.47
US Cars	PR	299	1.968	3.20	3.20	0.36	0.49	0.36	0.49
	FBRU	300	1.968	3.99	2.27	0.45	0.61	0.26	0.35
	FBRSU	300	1.968	4.65	3.16	0.53	0.71	0.36	0.48
Imported Vehicles	PR	99	1.983	4.47	4.47	0.89	1.20	0.89	1.20
	FBRU	99	1.983	4.50	2.51	0.90	1.21	0.50	0.68
	FBRSU	99	1.983	4.59	3.04	0.92	1.24	0.61	0.82

TABLE G-II

95% CONFIDENCE LIMITS FOR FBRU

50TH PERCENTILE ACCELERATION TECHNIQUE REQUIREMENTS

1981 Weighted Vehicle Population Groups

			Std. Dev. (S)		95% Confidence Limits			
					RON		MON	
Population	n	t	RON	MON	50%	90%	50%	90%
US and Imported Vehicles	414	1.966	4.74	2.57	0.46	0.62	0.25	0.33
US and Imported Cars	389	1.966	4.78	2.58	0.48	0.64	0.26	0.35
US Vehicles	316	1.968	3.89	2.14	0.43	0.58	0.24	0.32
US Cars	298	1.968	4.10	2.25	0.47	0.63	0.26	0.35
Imported Vehicles	98	1.983	5.17	2.82	1.04	1.40	0.56	0.76

TABLE G-III

95% CONFIDENCE LIMITS FOR MAXIMUM REQUIREMENTS

1981 Select Models

Car Model	Fuel	n	t	Std. Dev. (S) RON	Std. Dev. (S) MON	95% Confidence Limits RON 50%	RON 90%	MON 50%	MON 90%
HIA 238	PR	14	2.160	1.899	1.899	1.10	1.50	1.10	1.50
	FBRU	14	2.160	2.524	1.414	1.46	2.00	0.82	1.12
	FBRSU	14	2.160	3.003	2.037	1.73	2.38	1.18	1.61
IIA 238/LIA 238	PR	30	2.045	3.268	3.268	1.22	1.66	1.22	1.66
	FBRU	30	2.045	4.274	2.513	1.62	2.21	0.94	1.28
	FBRSU	30	2.045	5.213	3.564	1.95	2.65	1.33	1.81
NCX 228/HCX 228/ ICX 228/LCX 228	PR	19	2.101	2.813	2.813	1.36	1.85	1.36	1.85
	FBRU	19	2.101	3.076	1.905	1.48	2.03	0.92	1.25
	FBRSU	19	2.101	3.635	2.548	1.75	2.39	1.23	1.68
NC5 225/HC5 225/ IC5 225/LC5 225	PR	24	2.069	2.980	2.980	1.26	1.72	1.26	1.72
	FBRU	24	2.069	3.912	2.280	1.65	2.25	0.96	1.31
	FBRSU	24	2.069	4.048	2.762	1.71	2.33	1.17	1.59
OL 216/ML216	PR	14	2.160	3.566	3.566	2.06	2.83	2.06	2.83
	FBRU	14	2.160	3.587	2.086	2.07	2.84	1.20	1.65
	FBRSU	14	2.160	3.691	2.544	2.13	2.93	1.47	2.02

TABLE G-III

(Continued)

95% CONFIDENCE LIMITS FOR MAXIMUM REQUIREMENTS

1981 Select Models

Car Model	Fuel	n	t	Std. Dev. (S) RON	Std. Dev. (S) MON	95% Confidence Limits RON 50%	RON 90%	MON 50%	MON 90%
OL 216M/ML 216M	PR	13	2.179	2.839	2.839	1.72	2.36	1.72	2.36
	FBRU	13	2.179	2.515	1.383	1.52	2.09	0.84	1.15
	FBRSU	13	2.179	3.132	2.124	1.89	2.60	1.28	1.76
OCA 223/MCA 223	PR	16	2.131	2.406	2.406	1.28	1.76	1.28	1.76
	FBRU	16	2.131	2.880	1.601	1.53	2.10	0.85	1.17
	FBRSU	16	2.131	2.685	1.804	1.43	1.96	0.96	1.32
PL 217/KL 217	PR	14	2.160	3.251	3.251	1.88	2.58	1.88	2.58
	FBRU	14	2.160	3.554	2.590	2.05	2.82	1.50	2.05
	FBRSU	14	2.160	4.422	3.151	2.55	3.50	1.82	2.50
PC 222/KC 222	PR	24	2.069	4.278	4.278	1.81	2.46	1.81	2.46
	FBRU	24	2.069	4.232	2.753	1.79	2.44	1.16	1.58
	FBRSU	24	2.069	4.803	3.362	2.03	2.76	1.42	1.93

TABLE G-IV

95% CONFIDENCE LIMITS FOR FBRU

50TH PERCENTILE ACCELERATION TECHNIQUE REQUIREMENTS

1981 Select Models

			Std. Dev. (S)		95% Confidence Limits			
					RON		MON	
Model	n	t	RON	MON	50%	90%	50%	90%
HIA 238	14	2.160	2.865	1.620	1.65	2.27	0.94	1.28
IIA 238/LIA 238	30	2.045	4.137	2.434	1.54	2.10	0.91	1.24
NCX 228/HCX 228/ ICX 228/LCX 228	19	2.101	3.360	2.422	1.62	2.21	1.17	1.60
NC5 225/HC5 225/ IC5 225/LC5 225	24	2.069	4.636	2.698	1.96	2.67	1.14	1.55
OL 216/ML 216	14	2.160	3.244	1.851	1.87	2.57	1.07	1.47
OL 216M/ML 216M	13	2.179	2.743	1.560	1.66	2.28	0.94	1.30
OCA 223/MCA 223	16	2.131	3.392	1.952	1.81	2.48	1.04	1.42
PL 217/KL 217	14	2.160	3.494	2.612	2.02	2.77	1.51	2.07
PC 222/KC 222	23	2.074	5.076	3.555	2.20	2.99	1.54	2.10

APPENDIX H

OCTANE REQUIREMENTS FOR KNOCK SENSOR-EQUIPPED VEHICLES

TABLE H-1

OCTANE NUMBER REQUIREMENTS OF KNOCK SENSOR-EQUIPPED VEHICLES

			MAXIMUM REQUIREMENT				MINIMUM REQUIREMENT				BORDERLINE KNOCK				TANK			
Car Code	Fuel	Test Technique	ONR	RPM	Gear	Man. Vac.	ONR	RPM	Gear	Man. Vac.	ONR	RPM	Gear	Man. Vac.	INT	RPM	Gear	Man. Vac.
NTLG 450	Tank	E-15-81	-	-	-	-	-	-	-	-	-	-	-	-	B	2000	D	1.0
	FBRU	E-15-81	94	-	D	2.8	84	1900	D	1.0	91	2000	P	1.0	-	-	-	-
		50th % Accel.	91	-	D	-	88	-	-	2.8	86	2000	-	2.8	-	-	-	-
	FBRSU	E-15-81	97	-	D	1.0	85	1900	D	1.0	92	1900	D	1.9	-	-	-	-
	PR	E-15-81	93	-	P	1.0	84	2000	D	0.8	91	1300	D	2.8	-	-	-	-
NTLG 450	Tank	-	-	-	-	-	-	-	-	-	-	-	-	-	A	1600	D	3.0
	FBRU	E-15-81	99	1600	D	3.0	78	2000	D	3.0	99	1600	D	3.0	-	-	-	-
		50th % Accel.	95	2000	D	5.0	76*	2000	D	3.0	95	2000	-	3.0	-	-	-	-
	FBRSU	E-15-81	99	1600	D	3.0	78	1600	D	3.0	99	1600	D	3.0	-	-	-	-
	PR	E-15-81	95	2000	D	3.0	74*	2000	D	3.0	95	2000	D	3.0	-	-	-	-
NTLG 450	Tank	E-15-81	-	-	-	-	-	-	-	-	-	-	-	-	N	-	-	-
	FBRU	E-15-81	94	1500	D	2.0	82	1900	D	2.0	91	1900	D	2.0	-	-	-	-
		50th % Accel.	92	2400	D	2.0	82	2400	D	2.0	90	2600	-	2.0	-	-	-	-
	FBRSU	E-15-81	94	2500	P	2.0	85	2000	P	2.0	92	2600	P	2.0	-	-	-	-
	PR	E-15-81	92	2400	D	2.0	81	2500	D	2.0	89	2000	D	2.0	-	-	-	-
L4 441	Tank	E-15-81	-	-	-	-	-	-	-	-	-	-	-	-	B	3000	P	0.8
	FBRU	E-15-81	-	-	-	-	-	-	-	-	94	2450	D	1.2	-	-	-	-
		50th % Accel.	-	-	-	NO	METER	-	-	-	93	2300	-	1.3	-	-	-	-
	FBRSU	E-15-81	-	-	-	-	-	-	-	-	95	3300	P	0.8	-	-	-	-
	PR	E-15-81	-	-	-	-	-	-	-	-	90	3350	P	0.8	-	-	-	-
L4 441	Tank	E-15-81	-	-	-	-	-	-	-	-	-	-	-	-	A	2500	D	1.5
	FBRU	E-15-81	H	2400	D	1.2	89	2500	D	1.2	100	2450	D	1.2	-	-	-	-
		50th % Accel.	H	2700	D	1.2	89	2500	D	1.2	100	2700	D	1.2	-	-	-	-
	FBRSU	E-15-81	H	2200	D	1.5	89	2500	D	1.2	101	2200	D	1.2	-	-	-	-
	PR	E-15-81	95	2600	D	1.2	88	2600	D	1.2	94	2500	D	1.2	-	-	-	-
L4 441	Tank	E-15-81	-	-	-	-	-	-	-	-	-	-	-	-	B	1400	D	2.0
	FBRU	E-15-81	H	2000	D	3.0	94	2000	D	3.0	H	2000	D	3.0	-	-	-	-
		50th % Accel.	-	-	-	-	99	2400	D	5.0	99	2400	D	5.0	-	-	-	-
	FBRSU	E-15-81	H	2000	D	3.0	H	2000	D	3.0	H	2000	D	3.0	-	-	-	-
	PR	E-15-81	-	-	-	-	-	-	-	-	H	2200	D	3.0	-	-	-	-

* Estimated

A P P E N D I X I

MAXIMUM OCTANE NUMBER REQUIREMENTS OF SELECT MODELS

TABLE I-I

MAXIMUM OCTANE NUMBER REQUIREMENTS - 1981 SELECT MODELS

MODEL: HIA 238

Percent Satisfied	PRF ON	FBRU RON	FBRU MON	FBRU (R+M)/2	FBRSU RON	FBRSU MON	FBRSU (R+M)/2
5	85.2	84.7	79.7	82.2	85.1	77.4	81.3
10	85.9	85.6	80.2	82.9	86.2	78.2	82.2
20	86.7	86.7	80.8	83.8	87.5	79.1	83.3
30	87.3	87.5	81.3	84.4	88.5	79.7	84.1
40	87.8	88.2	81.6	84.9	89.3	80.3	84.8
50	88.3	88.8	82.0	85.4	90.0	80.8	85.4
60	88.8	89.5	82.4	85.9	90.8	81.3	86.0
70	89.3	90.1	82.7	86.4	91.6	81.9	86.7
80	89.9	90.9	83.2	87.1	92.6	82.5	87.5
90	90.7	92.1	83.8	87.9	93.9	83.4	88.6
95	91.4	93.0	84.3	88.6	95.0	84.1	89.6

TABLE I-I

(Continued)

MAXIMUM OCTANE NUMBER REQUIREMENTS - 1981 SELECT MODELS

MODEL: IIA 238/LIA 238

Percent Satisfied	PRF ON	FBRU RON	FBRU MON	FBRU (R+M)/2	FBRSU RON	FBRSU MON	FBRSU (R+M)/2
5	84.4	84.5	79.5	82.0	84.6	77.0	80.8
10	85.6	86.1	80.4	83.2	86.5	78.3	82.4
20	87.0	88.0	81.5	84.7	88.8	79.9	84.3
30	88.1	89.3	82.3	85.8	90.4	81.0	85.7
40	89.0	90.5	83.0	86.7	91.8	82.0	86.9
50	89.8	91.6	83.6	87.6	93.2	82.9	88.0
60	90.6	92.6	84.2	88.4	94.5	83.8	89.2
70	91.5	93.8	84.9	89.3	95.9	84.8	90.3
80	92.6	95.2	85.7	90.4	97.6	85.9	91.7
90	94.0	97.0	86.8	91.9	99.8	87.5	93.7
95	95.2	98.6	87.7	93.1	101.7	88.8	95.3

TABLE I-I
(Continued)

MAXIMUM OCTANE NUMBER REQUIREMENTS - 1981 SELECT MODELS

MODEL: NCX 228/HCX 228/ICX 228/LCX 228

Percent Satisfied	PRF ON	FBRU RON	FBRU MON	FBRU (R+M)/2	FBRSU RON	FBRSU MON	FBRSU (R+M)/2
5	80.0	80.3	76.8	78.6	80.9	74.4	77.6
10	81.0	81.5	77.5	79.5	82.2	75.3	78.8
20	82.3	82.8	78.3	80.6	83.8	76.4	80.1
30	83.2	83.8	78.9	81.4	85.0	77.2	81.1
40	83.9	84.6	79.5	82.0	86.0	77.9	81.9
50	84.6	85.4	79.9	82.7	86.9	78.6	82.7
60	85.3	86.2	80.4	83.3	87.8	79.2	83.5
70	86.1	87.0	80.9	84.0	88.8	79.9	84.3
80	87.0	88.0	81.5	84.8	90.0	80.7	85.3
90	88.2	89.3	82.4	85.9	91.6	81.8	86.7
95	89.3	90.5	83.1	86.8	92.9	82.8	87.8

TABLE I-I

(Continued)

MAXIMUM OCTANE NUMBER REQUIREMENTS - 1981 SELECT MODELS

MODEL: NC5 225/HC5 225/IC5 225/LC5 225

Percent Satisfied	PRF ON	FBRU RON	FBRU MON	FBRU (R+M)/2	FBRSU RON	FBRSU MON	FBRSU (R+M)/2
5	85.1	86.1	80.4	83.2	88.0	79.4	83.7
10	86.2	87.5	81.2	84.3	89.5	80.4	85.0
20	87.5	89.3	82.2	85.7	91.3	81.6	86.5
30	88.4	90.5	82.9	86.7	92.6	82.5	87.6
40	89.2	91.6	83.5	87.5	93.7	83.2	88.5
50	90.0	92.5	84.1	88.3	94.7	83.9	89.3
60	90.7	93.5	84.7	89.1	95.7	84.6	90.2
70	91.5	94.6	85.3	89.9	96.8	85.4	91.1
80	92.5	95.8	86.0	90.9	98.1	86.3	92.2
90	93.8	97.6	87.0	92.2	99.9	87.5	93.7
95	94.9	99.0	87.9	93.4	101.4	88.5	94.9

TABLE I-I

(Continued)

MAXIMUM OCTANE NUMBER REQUIREMENTS - 1981 SELECT MODELS

MODEL: OL 216/ML 216

Percent Satisfied	PRF ON	FBRU RON	FBRU MON	FBRU (R+M)/2	FBRSU RON	FBRSU MON	FBRSU (R+M)/2
5	85.4	86.1	80.3	83.3	87.0	78.6	82.8
10	86.7	87.4	81.1	84.3	88.4	79.6	84.0
20	88.3	89.0	82.0	85.5	90.0	80.7	85.3
30	89.4	90.2	82.7	86.4	91.2	81.5	86.3
40	90.4	91.1	83.2	87.2	92.2	82.2	87.2
50	91.3	92.0	83.8	87.9	93.1	82.8	88.0
60	92.2	92.9	84.3	88.6	94.0	83.5	88.8
70	93.2	93.9	84.9	89.4	95.0	84.2	89.6
80	94.3	95.1	85.5	90.2	96.2	85.0	90.6
90	95.9	96.6	86.4	91.5	97.8	86.1	92.0
95	97.2	97.9	87.2	92.5	99.2	87.0	93.1

TABLE I-I

(Continued)

MAXIMUM OCTANE NUMBER REQUIREMENTS - 1981 SELECT MODELS

MODEL: OL 216M/ML 216M

Percent Satisfied	PRF ON	FBRU RON	FBRU MON	FBRU (R+M)/2	FBRSU RON	FBRSU MON	FBRSU (R+M)/2
5	86.0	87.4	81.3	84.4	87.0	78.7	82.9
10	87.0	88.4	81.8	85.1	88.1	79.5	83.8
20	88.3	89.5	82.4	85.9	89.5	80.4	85.0
30	89.2	90.3	82.8	86.5	90.5	81.1	85.8
40	89.9	90.9	83.2	87.1	91.4	81.7	86.5
50	90.7	91.6	83.5	87.5	92.2	82.2	87.2
60	91.4	92.2	83.9	88.0	92.9	82.7	87.8
70	92.1	92.9	84.3	88.5	93.8	83.3	88.6
80	93.0	93.7	84.7	89.2	94.8	84.0	89.4
90	94.3	94.8	85.3	90.0	96.2	84.9	90.5
95	95.3	95.7	85.8	90.7	97.3	85.7	91.5

TABLE I-I

(Continued)

MAXIMUM OCTANE NUMBER REQUIREMENTS - 1981 SELECT MODELS

MODEL: OCA 223/MCA 223

Percent Satisfied	PRF ON	FBRU RON	FBRU MON	FBRU (R+M)/2	FBRSU RON	FBRSU MON	FBRSU (R+M)/2
5	85.4	85.3	80.1	82.7	87.0	78.7	82.9
10	86.3	86.4	80.6	83.5	88.0	79.4	83.7
20	87.3	87.6	81.3	84.5	89.1	80.2	84.7
30	88.1	88.6	81.8	85.2	90.0	80.8	85.4
40	88.7	89.3	82.3	85.8	90.7	81.2	86.0
50	89.3	90.1	82.7	86.4	91.4	81.7	86.6
60	90.0	90.8	83.1	86.9	92.1	82.2	87.1
70	90.6	91.6	83.5	87.5	92.8	82.7	87.7
80	91.4	92.5	84.0	88.2	93.7	83.2	88.4
90	92.4	93.8	84.7	89.2	94.8	84.0	89.4
95	93.3	94.8	85.3	90.0	95.8	84.7	90.2

TABLE I-I
(Continued)

MAXIMUM OCTANE NUMBER REQUIREMENTS - 1981 SELECT MODELS

MODEL: PL 217/KL 217

		FBRU			FBRSU		
Percent Satisfied	PRF ON	RON	MON	(R+M)/2	RON	MON	(R+M)/2
5	77.1	78.6	75.0	76.8	79.3	73.1	76.2
10	78.3	79.9	75.9	77.9	80.9	74.3	77.6
20	79.7	81.5	77.1	79.3	82.8	75.7	79.2
30	80.7	82.6	77.9	80.3	84.2	76.7	80.4
40	81.6	83.6	78.6	81.1	85.4	77.5	81.5
50	82.4	84.5	79.2	81.9	86.5	78.3	82.4
60	83.3	85.4	79.9	82.6	87.7	79.1	83.4
70	84.1	86.3	80.6	83.5	88.9	80.0	84.4
80	85.2	87.5	81.4	84.4	90.3	81.0	85.6
90	86.6	89.0	82.6	85.8	92.2	82.4	87.3
95	87.8	90.3	83.5	86.9	93.8	83.5	88.7

TABLE I-I

(Continued)

MAXIMUM OCTANE NUMBER REQUIREMENTS - 1981 SELECT MODELS

MODEL: PC 222/KC 222

Percent Satisfied	PRF ON	FBRU RON	FBRU MON	FBRU (R+M)/2	FBRSU RON	FBRSU MON	FBRSU (R+M)/2
5	77.2	78.8	75.5	77.2	79.2	73.1	76.1
10	78.8	80.3	76.5	78.4	80.9	74.3	77.6
20	80.7	82.2	77.7	80.0	83.0	75.8	79.4
30	82.0	83.5	78.6	81.1	84.5	76.9	80.7
40	83.2	84.7	79.4	82.0	85.8	77.8	81.8
50	84.3	85.8	80.1	82.9	87.1	78.7	82.9
60	85.4	86.8	80.7	83.8	88.3	79.5	83.9
70	86.5	88.0	81.5	84.7	89.6	80.4	85.0
80	87.9	89.3	82.4	85.8	91.1	81.5	86.3
90	89.8	91.2	83.6	87.4	93.2	83.0	88.1
95	91.3	92.7	84.6	88.7	95.0	84.2	89.6

TABLE I-II

MAXIMUM OCTANE NUMBER REQUIREMENTS OF INDIVIDUAL CARS OF

1981 SELECT MODEL HIA 238

		FBRU			FBRSU			
i	PRF ON	RON	MON	(R+M)/2	RON	MON	(R+M)/2	% Satisfied
1	86.0	85.5	80.1	82.8	86.0	78.0	82.0	3.57
2	86.0	86.0	80.4	83.2	87.0	78.7	82.8	10.71
3	86.0	86.0	80.4	83.2	87.0	78.7	82.8	17.86
4	87.0	88.0	81.6	84.8	88.0	79.4	83.7	25.00
5	88.0	88.0	81.6	84.8	89.0	80.1	84.6	32.14
6	88.0	88.0	81.6	84.8	89.5	80.4	85.0	39.29
7	88.0	88.0	81.6	84.8	90.0	80.8	85.4	46.43
8	88.0	89.0	82.1	85.6	90.0	80.8	85.4	53.57
9	88.0	89.0	82.1	85.6	90.0	80.8	85.4	60.71
10	89.0	89.0	82.1	85.6	90.0	80.8	85.4	67.86
11	89.0	89.0	82.1	85.6	90.0	80.8	85.4	75.00
12	90.0	91.0	83.2	87.1	92.0	82.1	87.0	82.14
13	90.0	92.0	83.7	87.8	95.0	84.1	89.6	89.29
14	93.0	95.0	85.5	90.2	97.0	85.5	91.2	96.43
N	14		14			14		
50% ($\bar{X}$)	88.286	88.821	82.007	85.421	90.036	80.786	85.407	
s	1.899	2.524	1.414	1.956	3.003	2.037	2.521	

TABLE I-II
(Continued)

MAXIMUM OCTANE NUMBER REQUIREMENTS OF INDIVIDUAL CARS OF 1981 SELECT MODEL IIA 238/LIA 238

#	PRF ON	FBRU RON	FBRU MON	FBRU (R+M)/2	FBRSU RON	FBRSU MON	FBRSU (R+M)/2	% Satisfied
1	85.0	86.0	80.4	83.2	86.0	78.0	82.0	1.67
2	85.0	86.0	80.4	83.2	87.0	78.7	82.8	5.00
3	86.0	87.0	81.0	84.0	87.0	78.7	82.8	8.33
4	86.0	87.0	81.0	84.0	87.0	78.7	82.8	11.67
5	86.0	87.0	81.0	84.0	87.0	78.7	82.8	15.00
6	87.0	87.0	81.0	84.0	88.0	79.4	83.7	18.33
7	87.0	87.0	81.0	84.0	88.0	79.4	83.7	21.67
8	87.0	88.0	81.6	84.8	88.0	79.4	83.7	25.00
9	88.0	88.0	81.6	84.8	89.0	80.1	84.6	28.33
10	88.5	89.0	82.1	85.6	89.0	80.1	84.6	31.67
11	89.0	89.0	82.1	85.6	89.0	80.1	84.6	35.00
12	89.0	90.0	82.7	86.4	90.0	80.8	85.4	38.33
13	89.0	90.0	82.7	86.4	91.0	81.4	86.2	41.67
14	89.0	90.0	82.7	86.4	92.0	82.1	87.0	45.00
15	90.0	90.5	83.0	86.7	93.0	82.8	87.9	48.33
16	90.0	91.0	83.2	87.1	93.0	82.8	87.9	51.67
17	90.0	92.0	83.7	87.8	94.0	83.4	88.7	55.00
18	90.0	92.0	83.7	87.8	94.0	83.4	88.7	58.33
19	90.0	92.0	83.7	87.8	95.0	84.1	89.6	61.67
20	90.5	93.0	84.3	88.6	95.0	84.1	89.6	65.00
21	91.0	94.0	84.9	89.4	95.0	84.1	89.6	68.33
22	91.0	94.0	84.9	89.4	97.0	85.5	91.2	71.67
23	91.0	94.0	84.9	89.4	98.0	86.2	92.1	75.00
24	92.0	95.0	85.5	90.2	98.0	86.2	92.1	78.33
25	92.0	95.5	85.8	90.6	99.0	86.9	93.0	81.67
26	92.5	96.0	86.0	91.0	99.0	86.9	93.0	85.00
27	92.5	97.0	86.7	91.8	101.0	88.3	94.6	88.33
28	94.0	98.0	87.4	92.7	H	H	H	91.67
29	96.0	H	H	H	H	H	H	95.04
30	100.0	H	H	H	H	H	H	98.33
N	30		30			30		
50% ($\bar{X}$)	89.800	91.567	83.600	87.570	93.167	82.910	88.040	
s	3.268	4.274	2.513	3.373	5.213	3.564	4.395	

TABLE I-II
(Continued)

MAXIMUM OCTANE NUMBER REQUIREMENTS OF INDIVIDUAL CARS OF

1981 SELECT MODEL MCX 228/HCX 228/ICX 228/LCX 228

i	PRF ON	FBRU RON	FBRU MON	FBRU (R+M)/2	FBRSU RON	FBRSU MON	FBRSU (R+M)/2	% Satisfied
1	78.0	80.0	76.1	78.0	80.0	73.6	76.8	2.63
2	80.0	82.0	77.8	79.9	82.0	75.1	78.6	7.89
3	82.0	82.0	77.8	79.9	84.0	76.5	80.2	13.16
4	83.0	82.0	77.8	79.9	84.0	76.5	80.2	18.42
5	83.0	84.0	79.2	81.6	84.0	76.5	80.2	23.68
6	84.0	84.0	79.2	81.6	85.0	77.3	81.2	28.95
7	84.0	84.0	79.2	81.6	86.0	78.0	82.0	34.21
8	84.0	84.0	79.2	81.6	86.0	78.0	82.0	39.47
9	84.0	85.0	79.8	82.4	86.0	78.0	82.0	44.74
10	85.0	85.0	79.8	82.4	86.0	78.0	82.0	50.00
11	85.0	85.0	79.8	82.4	87.0	78.7	82.8	55.26
12	85.0	86.0	80.4	83.2	87.0	78.7	82.8	60.53
13	85.0	86.0	80.4	83.2	87.0	78.7	82.8	65.79
14	86.0	86.0	80.4	83.2	88.0	79.4	83.7	71.05
15	87.0	87.5	81.3	84.4	90.0	80.8	85.4	76.32
16	87.0	88.0	81.6	84.8	90.0	80.8	85.4	81.58
17	88.0	90.0	82.7	86.4	92.0	82.1	87.0	86.84
18	89.0	90.0	82.7	86.4	93.0	82.8	87.9	92.11
19	89.0	92.0	83.7	87.8	94.0	83.4	88.7	97.37
N	19		19			19		
50% ($\bar{X}$)	84.632	85.395	79.942	82.668	86.895	78.574	82.721	
s	2.913	3.076	1.905	2.496	3.635	2.548	3.089	

TABLE I-II
(Continued)

MAXIMUM OCTANE NUMBER REQUIREMENTS OF INDIVIDUAL CARS OF

1981 SELECT MODEL NC5 225/HC5 225/IC5 225/LC5 225

	PRF	FBRU			FBRSU			%
i	ON	RON	MON	(R+M)/2	RON	MON	(R+M)/2	Satisfied
1	82.0	84.0	79.2	81.6	85.0	77.3	81.2	2.08
2	84.0	86.0	80.4	83.2	88.0	79.4	83.7	6.25
3	87.0	87.0	81.0	84.0	89.0	80.1	84.6	10.42
4	87.0	88.0	81.6	84.8	90.0	80.8	85.4	14.58
5	88.0	88.0	81.6	84.8	90.0	80.8	85.4	18.75
6	89.0	89.0	82.1	85.6	91.0	81.4	86.2	22.92
7	89.5	92.0	83.7	87.8	94.0	83.4	88.7	27.08
8	90.0	92.0	83.7	87.8	94.0	83.4	88.7	31.25
9	90.0	92.0	83.7	87.8	94.0	83.4	88.7	35.42
10	90.0	92.0	83.7	87.8	95.0	84.1	89.6	39.58
11	90.0	93.0	84.3	88.6	95.0	84.1	89.6	43.75
12	90.0	93.0	84.3	88.6	95.0	84.1	89.6	47.92
13	90.0	94.0	84.9	89.4	96.0	84.8	90.4	52.08
14	91.0	94.0	84.9	89.4	96.0	84.8	90.4	56.25
15	91.0	94.0	84.9	89.4	96.0	84.8	90.4	60.62
16	91.0	94.0	84.9	89.4	97.0	85.5	91.2	64.58
17	91.0	94.0	84.9	89.4	97.0	85.5	91.2	68.75
18	91.0	94.0	84.9	89.4	97.0	85.5	91.2	72.92
19	91.0	95.0	85.5	90.2	97.0	85.5	91.2	77.08
20	92.0	95.0	85.5	90.2	98.0	86.2	92.1	81.25
21	92.0	96.0	86.0	91.0	99.0	86.9	93.0	85.42
22	93.0	96.0	86.0	91.0	99.0	86.9	93.0	89.58
[illegible]	93.0	98.0	87.4	92.7	99.0	86.9	93.0	93.75
	97.0	H	H	H	H	H	H	97.92
N	24		24			24		
50% ($\bar{X}$)	89.979	92.542	84.108	88.296	94.708	83.942	89.333	
s	2.980	3.912	2.280	3.081	4.048	2.762	3.400	

TABLE I-II
(Continued)

MAXIMUM OCTANE NUMBER REQUIREMENTS OF INDIVIDUAL CARS OF

1981 SELECT MODEL OL 216/ML 216

		FBRU			FBRSU			
i	PRF ON	RON	MON	(R+M)/2	RON	MON	(R+M)/2	% Satisfied
1	81.5	83.0	78.5	80.8	83.0	75.8	79.4	3.57
2	88.5	89.0	82.1	85.6	89.5	80.4	85.0	10.71
3	89.0	89.0	82.1	85.6	91.0	81.4	86.2	17.86
4	89.0	91.0	83.2	87.1	92.0	82.1	87.0	25.00
5	91.0	91.5	83.4	87.5	93.0	82.8	87.9	32.14
6	92.0	92.0	83.7	87.8	93.0	82.8	87.9	39.29
7	92.0	92.0	83.7	87.8	93.0	82.8	87.9	46.43
8	92.0	92.0	83.7	87.8	94.0	83.4	88.7	53.57
9	92.0	92.0	83.7	87.8	94.0	83.4	88.7	60.71
10	93.0	94.0	84.9	89.4	95.0	84.1	89.6	67.86
11	93.0	94.0	84.9	89.4	95.0	84.1	89.6	75.00
12	94.0	95.0	85.5	90.2	96.0	84.8	90.4	82.14
13	95.0	97.0	86.7	91.8	97.0	85.5	91.2	89.29
14	96.0	97.0	86.7	91.8	98.0	86.2	92.1	96.43
N	14		14			14		
50% ($\bar{X}$)	91.286	92.036	83.771	87.886	93.107	82.829	87.971	
s	3.566	3.587	2.086	2.802	3.691	2.544	3.115	

TABLE I-II
(Continued)

MAXIMUM OCTANE NUMBER REQUIREMENTS OF INDIVIDUAL CARS OF

1981 SELECT MODEL OL 216M/ML 216M

		FBRU			FBRSU			
i	PRF ON	RON	MON	(R+M)/2	RON	MON	(R+M)/2	% Satisfied
1	85.0	87.0	81.0	84.0	86.0	78.0	82.0	3.85
2	87.0	88.0	81.6	84.8	88.0	79.4	83.7	11.54
3	88.0	90.0	82.7	86.4	89.0	80.1	84.6	19.23
4	89.0	90.0	82.7	86.4	91.0	81.4	86.2	26.92
5	91.0	90.0	82.7	86.4	92.0	82.1	87.0	34.62
6	91.0	92.0	83.7	87.8	92.0	82.1	87.0	42.31
7	91.0	92.0	83.7	87.8	93.0	82.8	87.9	50.00
8	91.0	92.0	83.7	87.8	93.0	82.8	87.9	57.69
9	92.0	92.5	84.0	88.2	93.0	82.8	87.9	65.38
10	92.0	93.0	84.3	88.6	94.0	83.4	88.7	73.08
11	92.5	94.0	84.9	89.4	94.0	83.4	88.7	80.77
12	93.0	94.0	84.9	89.4	95.0	84.1	89.6	88.46
13	96.0	96.0	86.0	91.0	98.0	86.2	92.1	96.15
N	13		13			13		
50% ($\bar{X}$)	90.654	91.577	83.531	87.538	92.154	82.200	87.177	
s	2.839	2.515	1.383	1.928	3.132	2.124	2.628	

TABLE I-II
(Continued)

MAXIMUM OCTANE NUMBER REQUIREMENTS OF INDIVIDUAL CARS OF

981 SELECT MODEL OCA 223/MCA 223

i	PRF ON	FBRU RON	FBRU MON	FBRU (R+M)/2	FBRSU RON	FBRSU MON	FBRSU (R+M)/2	% Satisfied
1	85.0	86.0	80.4	83.2	87.0	78.7	82.8	3.13
2	86.5	86.5	80.7	83.6	88.0	79.4	83.7	9.38
3	87.0	87.0	81.0	84.0	88.5	79.8	84.1	15.63
4	87.0	87.0	81.0	84.0	89.0	80.1	84.6	21.88
5	88.0	88.0	81.6	84.8	90.0	80.8	85.4	28.13
6	88.0	89.0	82.1	85.6	90.0	80.8	85.4	34.38
7	88.5	89.0	82.1	85.6	90.0	80.8	85.4	40.63
8	89.0	89.0	82.1	85.6	91.0	81.4	86.2	46.88
9	90.0	89.0	82.1	85.6	92.0	82.1	87.0	53.13
10	90.0	91.0	83.2	87.1	92.0	82.1	87.0	59.38
11	90.0	92.0	83.7	87.8	92.5	82.4	87.5	65.63
12	91.0	92.0	83.7	87.8	93.0	82.8	87.9	71.88
13	91.5	93.0	84.3	88.6	94.0	83.4	88.7	78.13
14	92.0	94.0	84.9	89.4	94.0	83.4	88.7	84.38
15	92.0	94.0	84.9	89.4	95.0	84.1	89.6	90.63
16	94.0	94.5	85.2	89.8	96.5	85.2	90.8	96.88
N	16		16			16		
50% ($\bar{X}$)	89.344	90.063	82.688	86.369	91.406	81.706	86.550	
s	2.406	2.880	1.601	2.214	2.685	1.804	2.248	

TABLE I-II
(Continued)

MAXIMUM OCTANE NUMBER REQUIREMENTS OF INDIVIDUAL CARS OF

1981 SELECT MODEL PL 217/KL 217

i	PRF ON	FBRU RON	FBRU MON	FBRU (R+M)/2	FBRSU RON	FBRSU MON	FBRSU (R+M)/2	% Satisfied
1	L	L	L	L	L	L	L	3.57
2	78.0	78.0	74.3	76.2	78.0	72.2	75.1	10.71
3	78.0	82.0	77.8	79.9	84.0	76.5	80.2	17.86
4	82.0	83.0	78.5	80.8	85.0	77.3	81.2	25.00
5	82.0	84.0	79.2	81.6	86.0	78.0	82.0	32.14
6	83.0	85.0	79.8	82.4	87.0	78.7	82.8	39.29
7	83.0	85.0	79.8	82.4	87.5	79.0	83.3	46.43
8	84.0	85.0	79.8	82.4	88.0	79.4	83.7	53.57
9	84.0	86.0	80.4	83.2	89.0	80.1	84.6	60.71
10	84.0	86.0	80.4	83.2	89.0	80.1	84.6	67.86
11	84.0	87.0	81.0	84.0	89.0	80.1	84.6	75.00
12	85.0	87.0	81.0	84.0	89.0	80.1	84.6	82.14
13	86.0	87.5	81.3	84.4	90.0	80.8	85.4	89.29
14	86.0	90.0	82.7	86.4	93.0	82.8	87.9	96.43
N	14		14			14		
50% ($\bar{X}$)	82.429	84.464	79.243	81.864	86.536	78.329	82.443	
s	3.251	3.554	2.590	3.065	4.422	3.151	3.805	

TABLE I-II
(Continued)

MAXIMUM OCTANE NUMBER REQUIREMENTS OF INDIVIDUAL CARS OF
1981 SELECT MODEL PC 222/KC 222

	PRF	FBRU			FBRSU			%
i	ON	RON	MON	(R+M)/2	RON	MON	(R+M)/2	Satisfied
1	L	L	L	L	L	L	L	2.08
2	76.0	80.0	76.1	78.0	80.0	73.6	76.8	6.25
3	80.0	80.0	76.1	78.0	81.0	74.4	77.7	10.42
4	80.0	82.0	77.8	79.9	82.0	75.1	78.6	14.58
5	80.0	82.0	77.8	79.9	83.0	75.8	79.4	18.75
6	82.0	82.0	77.8	79.9	84.0	76.5	80.2	22.92
7	82.0	83.0	78.5	80.8	84.0	76.5	80.2	27.08
8	82.0	83.0	78.5	80.8	84.5	76.9	80.7	31.25
9	82.5	84.0	79.2	81.6	84.5	76.9	80.7	35.42
10	83.0	84.0	79.2	81.6	85.0	77.3	81.2	39.58
11	83.0	84.5	79.5	82.0	85.0	77.3	81.2	43.75
12	83.0	85.0	79.8	82.4	85.0	77.3	81.2	47.92
13	84.0	85.0	79.8	82.4	86.0	78.0	82.0	52.08
14	86.5	88.0	81.6	84.8	90.0	80.8	85.4	56.25
15	87.0	88.0	81.6	84.8	91.0	81.4	86.2	60.42
16	87.0	88.0	81.6	84.8	91.0	81.4	86.2	64.58
17	88.0	88.0	81.6	84.8	91.0	81.4	86.2	68.75
18	88.0	89.0	82.1	85.6	91.0	81.4	86.2	72.92
19	88.0	90.0	82.7	86.4	91.0	81.4	86.2	77.08
20	88.0	90.0	82.7	86.4	91.0	81.4	86.2	81.25
21	88.0	90.0	82.7	86.4	92.0	82.0	87.0	85.42
22	88.0	90.5	83.0	86.7	92.0	82.1	87.0	89.58
23	90.0	91.0	83.2	87.1	93.5	83.1	88.3	93.75
24	91.5	94.0	84.9	89.4	95.0	84.1	89.6	97.92
N	24		24			24		
50% ($\bar{X}$)	84.271	85.750	80.050	82.904	87.063	78.654	82.858	
s	4.278	4.232	2.753	3.493	4.803	3.362	4.084	

TABLE I-III

50TH PERCENTILE ACCELERATION TECHNIQUE FBRU OCTANE NUMBER REQUIREMENTS

1981 SELECT MODELS

Percent Satisfied	Model: HIA 238			Model: IIA 238/LIA 238			Model: NCX 228/HCX 228/ ICX 228/LCX 228		
	RON	MON	(R+M)/2	RON	MON	(R+M)/2	RON	MON	(R+M)/2
5	82.9	78.7	80.8	83.3	78.8	81.1	77.3	74.1	75.7
10	84.0	79.3	81.6	84.8	79.6	82.2	78.5	75.0	76.7
20	85.2	80.0	82.6	86.6	80.7	83.7	80.0	76.1	78.0
30	86.1	80.5	83.3	87.9	81.5	84.7	81.0	76.8	78.9
40	86.9	80.9	83.9	89.1	82.1	85.6	81.9	77.5	79.7
50	87.6	81.3	84.5	90.1	82.8	86.4	82.8	78.1	80.4
60	88.4	81.7	85.0	91.2	83.4	87.3	83.6	78.7	81.2
70	89.1	82.2	85.7	92.3	84.0	88.1	84.5	79.4	82.0
80	90.1	82.7	86.4	93.6	84.8	89.2	85.6	80.1	82.9
90	91.3	83.4	87.3	95.4	85.9	90.6	87.1	81.2	84.2
95	92.4	84.0	88.2	96.9	86.8	91.8	88.3	82.1	85.2

TABLE I-III
(Continued)

50TH PERCENTILE ACCELERATION TECHNIQUE FBRU OCTANE NUMBER REQUIREMENTS

1981 SELECT MODELS

	Model: NC5 225/HC5 225/ IC5 225/LC5 225			Model: OL 216/ML 216			Model: OL 216M/ML 216M		
Percent Satisfied	RON	MON	(R+M)/2	RON	MON	(R+M)/2	RON	MON	(R+M)/2
5	83.4	78.8	81.1	85.5	80.1	82.8	83.8	79.1	81.5
10	85.0	79.8	82.4	86.7	80.7	83.8	84.8	79.7	82.3
20	87.1	80.9	84.0	88.1	81.6	84.9	86.0	80.4	83.2
30	88.5	81.8	85.2	89.1	82.1	85.7	86.9	80.9	83.9
40	89.8	82.5	86.2	90.0	82.6	86.3	87.6	81.3	84.5
50	91.0	83.2	87.1	90.8	83.1	87.0	88.3	81.7	85.0
60	92.2	83.9	88.0	91.6	83.6	87.6	89.0	82.1	85.6
70	93.4	84.6	89.0	92.5	84.1	88.3	89.7	82.5	86.1
80	94.9	85.5	90.1	93.6	84.7	89.1	90.6	83.0	86.8
90	96.9	86.7	91.8	95.0	85.5	90.2	91.8	83.7	87.8
95	98.6	87.7	93.1	96.2	86.2	91.1	92.8	84.3	88.5

TABLE I-III
(Continued)

50TH PERCENTILE ACCELERATION TECHNIQUE FBRU OCTANE NUMBER REQUIREMENTS

1981 SELECT MODELS

Percent Satisfied	Model: OCA 223/MCA 223			Model: PL 217/KL 217			Model: PC 222/KC 222		
	RON	MON	(R+M)/2	RON	MON	(R+M)/2	RON	MON	(R+M)/2
5	82.8	78.5	80.7	77.6	74.2	75.9	75.3	72.7	74.0
10	84.1	79.2	81.7	78.9	75.2	77.0	77.2	73.9	75.6
20	85.6	80.1	82.8	80.4	76.3	78.4	79.4	75.5	77.5
30	86.6	80.7	83.7	81.5	77.1	79.3	81.0	76.6	78.9
40	87.5	81.2	84.4	82.5	77.8	80.2	82.4	77.6	80.0
50	88.4	81.7	85.1	83.4	78.5	80.9	83.7	78.5	81.1
60	89.3	82.2	85.7	84.2	79.2	81.7	85.0	79.4	82.2
70	90.2	82.8	86.5	85.2	79.9	82.5	86.4	80.4	83.4
80	91.3	83.4	87.3	86.3	80.7	83.5	88.0	81.5	84.7
90	92.8	84.2	88.5	87.8	81.8	84.8	90.2	83.1	86.6
95	94.0	84.9	89.4	89.3	82.8	86.0	92.0	84.4	88.2

TABLE I-IV

50TH PERCENTILE ACCELERATION TECHNIQUE FBRU OCTANE NUMBER REQUIREMENTS OF INDIVIDUAL CARS OF 1981 SELECT MODELS

	Model: HIA 238				Model IIA 238/LIA 238			
i	RON	MON	(R+M)/2	% Satisfied	RON	MON	(R+M)/2	% Satisfied
1	85.0	79.8	82.4	3.57	84.0	79.2	81.6	1.67
2	85.0	79.8	82.4	10.71	84.5	79.5	82.0	5.00
3	85.0	79.8	82.4	17.86	85.0	79.8	82.4	8.33
4	85.0	79.8	82.4	25.00	85.0	79.8	82.4	11.67
5	87.0	81.0	84.0	32.14	86.0	80.4	83.2	15.00
6	87.0	81.0	84.0	39.29	86.0	80.4	83.2	18.33
7	87.0	81.0	84.0	46.43	87.0	81.0	84.0	21.67
8	87.0	81.0	84.0	53.57	87.0	81.0	84.0	25.00
9	87.0	81.0	84.0	60.71	87.0	81.0	84.0	28.33
10	87.5	81.3	84.4	67.86	88.0	81.6	84.8	31.67
11	88.0	81.6	84.8	75.00	88.0	81.6	84.8	35.00
12	89.5	82.4	86.0	82.14	89.0	82.1	85.6	38.33
13	92.0	83.7	87.8	89.29	89.0	82.1	85.6	41.67
14	95.0	85.5	90.2	96.43	89.0	82.1	85.6	45.00
15					90.0	82.7	86.4	48.33
16					90.0	82.7	86.4	51.67
17					90.5	83.0	86.7	55.00
18					91.0	83.2	87.1	58.33
19					91.0	83.2	87.1	61.67
20					91.0	83.2	87.1	65.00
21					91.0	83.2	87.1	68.33
22					92.0	83.7	87.8	71.67
23					92.5	84.0	88.2	75.00
24					93.0	84.3	88.6	78.33
25					93.0	84.3	88.6	81.67
26					94.0	84.9	89.4	85.00
27					94.0	84.9	89.4	88.33
28					95.0	85.5	90.2	91.67
29					100.0	88.8	94.4	95.04
30					H	H	H	98.33
N		14				30		
50% ($\bar{X}$)	87.643	81.336	84.486		90.117	82.757	86.430	
s	2.865	1.620	2.229		4.137	2.434	3.269	

TABLE I-IV
(Continued)

50TH PERCENTILE ACCELERATION TECHNIQUE FBRU OCTANE NUMBER REQUIREMENTS OF INDIVIDUAL CARS OF 1981 SELECT MODELS

	Model: NCX 228/HCX 228/ ICX 228/LCX 228				Model: NC5 225/HC5 225/ IC5 225/LC5 225			
i	RON	MON	(R+M)/2	% Satisfied	RON	MON	(R+M)/2	% Satisfied
1	78.0	74.3	76.2	2.63	83.0	78.5	80.8	2.08
2	78.0	74.3	76.2	7.89	84.0	79.2	81.6	6.25
3	79.0	75.2	77.1	13.16	84.0	79.2	81.6	10.42
4	80.0	76.1	78.0	18.42	85.0	79.8	82.4	14.58
5	80.0	76.1	78.0	23.68	85.0	79.8	82.4	18.75
6	80.0	76.1	78.0	28.95	87.0	81.0	84.0	22.92
7	80.0	76.1	78.0	34.21	88.0	81.6	84.8	27.08
8	82.0	77.8	79.9	39.47	90.0	82.7	86.4	31.25
9	82.0	77.8	79.9	44.74	90.0	82.7	86.4	35.42
10	82.0	77.8	79.9	50.00	90.0	82.7	86.4	39.58
11	83.0	78.5	80.8	55.26	90.0	82.7	86.4	43.75
12	84.0	79.2	81.6	60.53	92.0	83.7	87.8	47.92
13	84.0	79.2	81.6	65.79	92.0	83.7	87.8	52.08
14	85.0	79.8	82.4	71.05	92.5	84.0	88.2	56.25
15	86.0	80.4	83.2	76.32	93.0	84.3	88.6	60.42
16	87.0	81.0	84.0	81.58	93.0	84.3	88.6	64.58
17	87.0	81.0	84.0	86.84	93.0	84.3	88.6	68.75
18	87.0	81.0	84.0	92.11	93.0	84.3	88.6	72.92
19	89.0	82.1	85.6	97.37	94.0	84.9	89.4	77.08
20					95.0	85.5	90.2	81.25
21					96.0	86.0	91.0	85.42
22					96.0	86.0	91.0	89.58
23					97.0	86.7	91.8	93.75
24					H	H	H	97.92
N		19				24		
50% ($\bar{X}$)	82.789	78.095	80.442		90.979	83.213	87.083	
s	3.360	2.422	2.894		4.636	2.698	3.644	

TABLE I-IV
(Continued)

50TH PERCENTILE ACCELERATION TECHNIQUE FBRU OCTANE NUMBER REQUIREMENTS OF INDIVIDUAL CARS OF 1981 SELECT MODELS

	Model: OL 216/ML 216				Model: OL 216M/ML 216M			
i	RON	MON	(R+M)/2	% Satisfied	RON	MON	(R+M)/2	% Satisfied
1	83.0	78.5	80.8	3.57	85.0	79.8	82.4	3.85
2	88.0	81.6	84.8	10.71	85.0	79.8	82.4	11.54
3	89.0	82.1	85.6	17.86	85.0	79.8	82.4	19.23
4	90.0	82.7	86.4	25.00	86.0	80.4	83.2	26.92
5	90.0	82.7	86.4	32.14	86.5	80.7	83.6	34.62
6	90.0	82.7	86.4	39.29	88.0	81.6	84.8	42.31
7	90.0	82.7	86.4	46.43	89.0	82.1	85.6	50.00
8	90.0	82.7	86.4	53.57	89.0	82.1	85.6	57.69
9	91.0	83.2	87.1	60.71	89.0	82.1	85.6	65.38
10	93.0	84.3	88.6	67.86	90.0	82.7	86.4	73.08
11	93.0	84.3	88.6	75.00	90.5	83.0	86.7	80.77
12	93.5	84.6	89.0	82.14	91.0	83.2	87.1	88.46
13	95.0	85.5	90.2	89.29	94.0	84.9	89.4	96.15
14	96.0	86.0	91.0	96.43				
N		14				13		
50% ($\overline{X}$)	90.821	83.114	86.979		88.308	81.708	85.015	
s	3.244	1.851	2.518		2.743	1.560	2.145	

TABLE I-IV
(Continued)

50TH PERCENTILE ACCELERATION TECHNIQUE FBRU OCTANE NUMBER REQUIREMENTS OF INDIVIDUAL CARS OF 1981 SELECT MODELS

	Model: OCA 223/MCA 223				Model: PL 217/KL 217			
i	RON	MON	(R+M)/2	% Satisfied	RON	MON	(R+M)/2	% Satisfied
1	82.0	77.8	79.9	3.13	L	L	L	3.57
2	85.0	79.8	82.4	9.38	L	L	L	10.71
3	85.0	79.8	82.4	15.63	80.0	76.1	78.0	17.86
4	86.0	80.4	83.2	21.88	82.0	77.8	79.9	25.00
5	86.0	80.4	83.2	28.13	82.0	77.8	79.9	32.14
6	86.0	80.4	83.2	34.38	84.0	79.2	81.6	39.29
7	87.0	81.0	84.0	40.63	84.0	79.2	81.6	46.43
8	88.0	81.6	84.8	46.88	84.0	79.2	81.6	53.57
9	88.0	81.6	84.8	53.13	84.5	79.5	82.0	60.71
10	90.0	82.7	86.4	59.38	85.0	79.8	82.4	67.86
11	90.0	82.7	86.4	65.63	85.0	79.8	82.4	75.00
12	91.0	83.2	87.1	71.88	86.5	80.7	83.6	82.14
13	91.0	83.2	87.1	78.13	87.0	81.0	84.0	89.29
14	92.0	83.7	87.8	84.38	89.0	82.1	85.6	96.43
15	93.5	84.6	89.0	90.63				
16	94.0	84.9	89.4	96.88				
N		16				14		
50% ($\bar{X}$)	88.406	81.738	85.069		83.357	78.500	80.929	
s	3.392	1.952	2.661		3.494	2.612	3.058	

TABLE I-IV
(Continued)

50TH PERCENTILE ACCELERATION TECHNIQUE FBRU OCTANE NUMBER REQUIREMENTS OF INDIVIDUAL CARS OF 1981 SELECT MODELS

Model: PC 222/KC 222

i	RON	MON	(R+M)/2	% Satisfied
1	L	L	L	2.17
2	L	L	L	6.52
3	78.0	74.3	76.2	10.87
4	78.0	74.3	76.2	15.22
5	78.0	74.3	76.2	19.57
6	78.0	74.3	76.2	23.91
7	79.0	75.2	77.1	28.26
8	80.0	76.1	78.0	32.61
9	81.0	77.0	79.0	36.96
10	82.0	77.8	79.9	41.30
11	82.0	77.8	79.9	45.65
12	82.0	77.8	79.9	50.00
13	86.0	80.4	83.2	54.35
14	86.0	80.4	83.2	58.70
15	87.0	81.0	84.0	63.04
16	87.0	81.0	84.0	67.39
17	87.0	81.0	84.0	71.74
18	88.0	81.6	84.8	76.09
19	89.0	82.1	85.6	80.43
20	90.0	82.7	86.4	84.78
21	90.0	82.7	86.4	89.13
22	90.0	82.7	86.4	93.48
23	93.0	84.3	88.6	97.83
N		23		
50% ($\bar{X}$)	83.696	78.504	81.113	
s	5.076	3.555	4.309	

APPENDIX J

SPEED RANGE DATA

TABLE J-I

OBS NO	LAB NO	MODEL CODE	EMCT	TRANS	CR	AIR	SPARK ADVANCE AS RCD	SPARK ADVANCE AS TST	ODOM MILES	AMB TMP	BARO	HUM	1000	1250	1500	1750	2000	2250	2500	2750	3000	3250	3500	3750
													PRIMARY R.F. OCTANE NUMBER REQUIREMENTS, AT RPM											
376	41	BA F17M	C	M	8.2	N	- 3	- 3	11440	77	29.84	63		88.0	88.0	87.5	87.0			87.0	87.7	88.5	89.0	89.0
203	4	DI 137	F	A	8.4	Y	+12	+12	11120	84	29 17	43				88 5	90.0	90.0	89.5	89.0	88.5	88.0	87.0	86.0
378	41	DI 137	C	A	8.4	Y	+16	+16	6322	71	30.00	64				83.0	84.0	82.5						
104	5	DI 252	F	A	8.5	Y	+16	+16	6033	69	30.22	72			92.5	88.0	87.5	87.5	87.0					
336	46	DI 252	F	A	8.5	Y	+16	+16	8344	74	29.58	90			86 0	89.0								
110	5	G9 F60	F	A	8.2	Y	+ 8	+10	4838	73	30.10	60					85.5	86.0	85.5	84.0	83.0	82.0	81.0	80.5
410	26	G9 F60	F	A	8.2	Y	+10	+10	12055	98	30.00	124			88.0	89.0	86.0	84.5	82.0	80.0				
47	29	HC5 225	F	A	8.2	Y	+ 4	+ 4	7554	70	30.10	59					86.0	90.0	87.0	86.5	86.0			
79	3	HC5 225	F	A	8.2	Y	+ 4	+ 4	8210	80	30.12	50						90.0	90.0	89.0	88.0	86.5	84.5	
197	4	HC5 225	F	A	8.2	N	+ 4	+ 4	6370	83	28.86	100			78.5	80.5	82.0	83.5	84.0	83.0	82.0	81.0	80.5	79.5
363	8	HC5 225	F	A	8.2	Y	+ 4	+ 4	11859	80	29.96	74						87.0	86.0					
401	26	HC5 225	F	A	8.2	Y	+ 4	+ 4	23285	83	30.17	76					84.0	87.0	89.5	89.0	88.0	85.5	84.0	81.5
416	26	HC5 225	F	A	8.2	Y	+ 4	+ 4	20170	70	30.02	75					88.0	89.5	91.5	91.0	89.5	88.5	87.5	86.5
191	4	HFW 449	F	A	8.1	Y	+12	+12	9752	72	29.52	45					85.0	86.0	87.0	87.0	86.0	85.5	84.0	
94	3	HIA 238	F	A	8.0	Y	+15	+15	17843	70	29.29	80					85.5	85.0	84.0	83.0	82.0	80.0		
115	5	HIA 238	F	A	8.0	Y	+15	+15	5125	70	30.07	52			86.0	88.0	86.5	85.5	85.0	84.0	83.5	82.0		
192	4	HIA 238	F	A	8.0	Y	+14	+14	8282	80	29.53	63		88.5	89.5	90.0	89.0	87.5	86.0	85.0	84.5	83.5	83.0	82.5
340	46	HIA 238	F	A	8.0	Y	+15	+15	10083	78	29.28	110				83.5	86.0	85.5	85.0	84.0				
341	46	HIA 238	F	A	8.0	Y	+15	+15	9581	78	29.58	120				85.0	88.0	85.0	82.0					
342	46	HIA 238	F	A	8.0	Y	+15	+15	7928	78	29.27	103					86.0	85.0	84.0					
343	46	HIA 238	F	A	8.0	Y	+15	+15	8635	77	29.41	78				86 0	89.0	87.5						
344	46	HIA 238	F	A	8.0	Y	+15	+15	7984	72	29.12	86			80.0	87.5	88.0	83.0						

TABLE J-I
(Continued)

OBS NO	LAB NO	MODEL CODE	EMCT	TRANS	CR	AIR	SPARK ADVANCE AS RCD	AS TST	ODOM MILES	AMB TMP	BARO	HUM	PRIMARY R.F. OCTANE NUMBER REQUIREMENTS, AT RPM 1000	1250	1500	1750	2000	2250	2500	2750	3000	3250	3500	3750
348	46	HIA 238	F	A	8.0	Y	+15	+15	8473	78	29.38	122					87.0	86.0	85.5					
351	46	HIA 238	F	A	8.0	Y	+15	+15	9940	76	29.50	90							85.0	85.0	84.0	83.5		
362	8	HIA 238	F	A	8.0	Y	+15	+15	6467	85	29.64	91				88.0	86.5							
7	40	HIS 243	F	A	8.3	Y	+12	+12	10066	75	29.42	82	83.0	90.5	92.0	87.0	83.5	81.0						
114	5	ICX 228	F	A	8.5	N	+10	+10	4202	70	30.04	52					82.0	84.0	84.0	83.5	82.5	81.5	80.5	80.0
274	47	ICX 228	C	A	8.5	Y	+ 8	+10	6300	70	29.60	50					84.0	86.0	84.0	82.5	81.0	78.5	76.5	
360	8	ICX 228	F	A	8.5	Y	+10	+10	18175	80	30.00	64								78.0	80.0	80.0		
193	4	IC5 225	F	A	8.2	Y	+ 4	+ 4	9730	77	29.42	40				84.0	85.0	86.5	88.0	86.5	85.5	85.0	84.5	84.0
218	28	IC5 225	F	A	8.2	Y	+ 4	+ 4	12324	71	29.48	88			87.0	91.0	91.0	88.0	86.0					
271	7	IC5 225	F	A	8.2	Y	+ 2	+ 4	13960	72	30.13	59						87.5	88.8	90.0	90.6	91.0	87.5	
355	46	IC5 225	F	A	8.2	Y	+ 4	+ 4	10846	76	29.38	112				80.5	82.0	82.0	82.0	82.0	82.0			
42	29	IIA 238	F	A	8.0	Y	+15	+15	7653	70	30.24	59				89.0	88.0	87.0	87.0	87.0				
83	3	IIA 238	F	A	8.0	Y	+15	+15	6172	78	29.79	83					85.0	85.0	85.0	85.0	84.0			
113	5	IIA 238	F	A	8.0	Y	+15	+15	8690	70	29.88	48				89.0	88.0	86.0	85.0	84.5	84.0	83.0	82.0	
202	4	IIA 238	F	A	8.0	Y	+14	+14	10680	83	29.23	54			85.0	86.0	85.0	84.0	83.0	82.0	81.0	80.5	80.0	
222	28	IIA 238	F	A	8.0	Y	+15	+15	16437	73	29.32	90			85.0	87.0	86.5	83.0	82.0					
251	7	IIA 238	F	A	8.0	Y	+15	+15	15000	72	30.17	44			89.0	90.0	89.6	88.5	87.2	85.6	84.0			
254	7	IIA 238	F	A	8.0	Y	+12	+15	4600	74	30.28	48			90.5	92.0	91.8	91.0	90.0	88.6	87.0			
276	47	IIA 238	C	A	8.0	Y	+13	+15	10550	70	29.76	62	86.0	89.0	92.5	92.5	90.0	88.0	87.5	87.0	87.0	86.5	86.0	
284	47	IIA 238	C	A	8.0	Y	+15	+15	19940	70	29.64	60			86.0	88.5	87.5	87.0	86.0					
285	47	IIA 238	C	A	8.0	Y	+12	+15	8800	70	29.62	60			90.5									
349	46	IIA 238	F	A	8.0	Y	+15	+15	13055	74	29.28	83				87.0	86.5	85.5	84.5					

TABLE J-I
(Continued)

OBS NO	LAB NO	MODEL CODE	EMCT	TRANS	CR	AIR	SPARK ADVANCE AS RCD	SPARK ADVANCE AS TST	ODOM MILES	AMB TMP	BARO	HUM	1000	1250	1500	1750	2000	2250	2500	2750	3000	3250	3500	3750
													PRIMARY R.F. OCTANE NUMBER REQUIREMENTS, AT RPM											
371	41	IIA 238	C	A	8.0	Y	+13	+15	8298	71	29.98	64				90.0	90.0	89.5	89.0					
394	26	IIA 238	F	A	8.0	Y	+19	+15	5448	93	29.98	134			85.0	85.5	83.5	83.0	81.0	80.0				
298	47	IIF 243	C	A	7.5	Y	+20	+20	12417	70	29.76	62			82.0	83.5	86.5	84.0	83.5	83.0	83.0	82.5	82.0	
404	26	IIF 243	F	A	7.5	Y	+20	+20	7243	96	29.87	137		83.0	87.0	86.5	85.0	82.5	80.0					
407	26	IY 450	F	A	7.9	Y	+15	+15	10057	95	29.95	131	80.0	80.5	81.0	83.5	80.5	80.0	80.0	80.0	80.0			
24	29	KL 217	F	A	8.2	N	+10	+10	10190	70	29.77	60					83.0	82.5	81.5	80.0	78.5			
103	5	KL 217	F	A	8.2	N	+10	+10	10132	70	29.83	40					81.5	83.5	84.0	83.0	82.0	81.0	79.5	78.5
253	7	KL 217	F	A	8.2	N	+10	+10	7089	70	30.06	50							78.9	81.0	82.9	84.0	83.0	81.8
235	28	KL 222M	F	M	8.5	Y	+10	+10	12248	82	29.48	102		91.0	91.0	91.0	90.0	87.0	86.0	85.0				
14	22	KC 222	F	A	8.5	Y	+10	+10	8678	70	29.13	62					79.0	80.0	79.5	79.0	78.5	78.5	76.5	
55	29	KC 222	F	A	8.5	Y	+10	+10	11721	70	30.02	55					84.0	88.0	87.5	86.5	85.5	85.0	84.0	
236	28	KC 222	F	A	8.5	Y	+10	+10	9315	79	29.38	70			83.0	85.5	87.0	86.0	85.0	83.5	82.0			
237	28	KC 222	F	A	8.5	Y	+10	+10	12292	79	29.35	80				84.0	87.0	86.5	86.0	84.0	81.0	80.0		
330	46	KC 222	F	A	8.5	Y	+10	+10	7876	68	29.33	74			81.0	82.0	81.0	79.5						
49	29	KC 222M	F	M	8.5	Y	+10	+10	12300	70	29.77	80	85.5											
234	28	KC 222M	F	M	8.5	Y	+10	+10	14781	69	29.31	86			88.0	86.5								
238	28	KC 226	F	A	8.2	Y	+7	+7	12587	73	29.54	80				84.0	85.5	87.5	90.0	90.0	88.0	85.5	82.0	
92	29	KI 137	F	A	8.4	Y	+12	+12	12665	70	30.20	57				90.5	90.5	87.5	86.0	85.0	84.5			
409	28	KI 137	F	A	8.4	Y	+12	+12	9571	90	30.00	107			87.0	87.5	88.0	86.5	85.0	82.0	80.0			
388	26	KI 252	F	A	8.5	Y	+16	+16	9844	94	30.00	[illegible]		86.0	90.0	89.5	86.5	85.5	85.0	84.0				
91	3	LCX 228	F	A	8.5	Y	+10	+10	8280	72	29.83	62								84.0	83.5	83.0	82.0	
180	4	LCX 228	F	A	8.5	N	+10	+10	5542	75	29.32	44				83.5	85.0	85.0	84.5	83.5	82.0	79.5		

TABLE J-I
(Continued)

OBS NO	LAB NO	MODEL CODE	EMCT	TRANS	CR	AIR	SPARK ADVANCE AS RCD	SPARK ADVANCE AS TST	ODOM MILES	AMB TMP	BARO	HUM	PRIMARY R.F. OCTANE NUMBER REQUIREMENTS, AT RPM 1000	1250	1500	1750	2000	2250	2500	2750	3000	3250	3500	3750
219	28	LCX 228	F	A	8.5	Y	+10	+10	8833	69	29.50	67				77.2	78.0	79.5	82.0	81.5	78.5			
270	7	LCX 228	F	A	8.5	Y	+10	+10	6936	70	30.40	60							84.0	83.0	82.0	80.5	78.7	
345	46	LCX 228	F	A	8.5	Y	+10	+10	14398	76	29.60	70							82.0	82.0	82.0			
92	3	LCS 225	F	A	8.2	Y	+ 4	+ 4	5925	74	29.93	92							92.0	91.5	90.0	88.0	85.0	
217	28	LCS 225	F	A	8.2	Y	+ 4	+ 4	13121	70	29.44	72					86.0	90.5	91.0	91.0	90.5	88.5	86.5	
384	41	LCS 225	C	A	8.2	Y	+ 4	+ 4	6590	77	30.04	64						88.0	88.5	88.0				
108	5	LIA 238	F	A	8.0	Y	+15	+15	6941	71	29.99	50			84.0	86.0	85.5	84.0	83.5	83.0	82.0	81.0	79.5	
209	4	LIA 238	F	A	8.0	Y	+15	+15	10054	76	29.13	96		82.5	85.0	87.0	86.0	84.5	83.5	82.5	82.0	81.5	81.0	
256	7	LIA 238	F	A	8.0	Y	+15	+15	14756	72	29.68	47				86.5	89.0	91.3	92.0	90.0	87.8			
288	47	LIA 238	C	A	8.0	Y	+12	+15	15210	70	29.76	62		92.0	92.0	90.5	89.5	87.5	86.0	83.5	82.0			
354	46	LIA 238	F	A	8.0	Y	+15	+15	5344	72	29.50	58					95.0	94.5	93.5					
380	41	LIA 238	C	A	8.0	Y	+13	+15	6200	72	29.97	60				87.5	87.5	86.5						
403	26	LIA 238	F	A	8.0	Y	+15	+15	46789	91	29.80	131			90.0	89.0	87.0	85.5	85.0	84.5	83.0	81.5		
221	28	LA 238	F	A	8.0	Y	+15	+15	16370	75	29.41	91			80.5	82.0	80.8							
95	3	LY 450	F	A	7.9	Y	+15	+15	12796	74	29.97	78					80.0	80.0	80.0	79.5	79.0	78.5	78.0	
109	5	LY 450	F	A	7.9	Y	+15	+15	10071	70	30.15	56			84.0	85.0	84.5	83.0	82.5	82.0	81.5	81.0		
225	28	LY 450	F	A	7.9	Y	+18	+18	8060	78	29.36	86			80.0	87.5	88.0	86.0	82.0					
23	29	L4 441	F	A	8.0	Y	+15	+15	15108	70	29.98	64				88.5	95.0	93.5	89.0					
252	7	ML 216	F	A	8.8	Y	+ 8	+ 8	5693	72	30.36	43			88.0	90.6	93.0	92.9	92.2	91.9	91.2	90.6	89.9	88.9
281	47	ML 216	C	A	8.8	Y	+ 6	+ 6	10400	70	29.68	64			88.0	88.0	88.0	88.0	87.5	86.5	86.0	85.0	84.0	
6	40	ML 216M	F	M	8.8	N	+10	+10	10159	75	29.50	110			93.2	92.5	91.0	89.5	88.0	86.5	84.5			
228	28	ML 216M	F	M	8.8	Y	+10	+10	9281	78	29.35	71		88.0	89.2	88.7	88.0	87.0	85.8	84.0	82.7			

TABLE J-I
(Continued)

OBS NO	LAB NO	MODEL CODE	EMCT	TRANS	CR	AIR	SPARK ADVANCE AS RCD	SPARK ADVANCE AS TST	ODOM MILES	AMB TMP	BARO	HUM	1000	1250	1500	1750	2000	2250	2500	2750	3000	3250	3500	3750
													PRIMARY R.F. OCTANE NUMBER REQUIREMENTS, AT RPM											
358	8	ML 216M	F	M	8.8	Y	+10	+10	8906	83	29.66	79				85.0	85.0	84.5	83.5	83.0	82.5	81.5	81.0	
266	7	MCA 223	F	A	9.0	Y	+ 8	+12	6710	73	30.37	64					82.0	83.0	84.4	86.0	88.0	86.0	83.8	82.6
324	46	MCB 133	F	A	8.6	Y	+12	+10	10664	72	29.50	66					84.5	86.0	87.5	88.0	86.0	85.0	84.0	
370	41	MCB 133	C	A	8.6	N	+10	+10	6500	70	29.90	88					85.5	87.0	87.0	87.0	86.0			
365	8	MCB 223	F	A	9.0	Y	+12	+12	7582	86	29.84	108					86.5	88.0	89.0					
361	8	MCS 223	F	A	9.0	Y	+12	+12	7610	80	30.02	64					90.0	91.5	92.0					
264	7	MCS 223M	F	M	9.0	N	+ 6	+ 6	5972	71	30.60	61				92.1	93.0	94.0	95.4	97.6	95.0	93.0	91.7	90.3
233	28	MI 242	F	A	8.2	Y	+10	+10	17039	70	29.44	75		91.0	90.5	89.5	88.0							
265	7	MI 242	F	A	8.2	Y	+10	+10	12181	70	30.59	60					93.5	92.7	91.8	90.2	87.0			
269	7	M V250	F	A	8.4	Y	+ 8	+ 8	7827	70	30.41	59		88.2	89.0	87.3	85.7	84.4	83.2	82.3	81.5	80.6	80.0	
201	4	NL9 216	F	A	8.6	Y	+20	+20	16580	72	29.30	49						83.5	85.5	86.0	85.5	84.5	84.0	83.0
267	7	NL9 216	F	A	8.6	Y	+22	+18	9354	71	29.99	61						88.5	91.0	92.0	91.0	89.9	88.7	87.3
379	41	NL9 216	C	A	8.6	Y	+20	+20	6390	81	29.90	54							85.0	86.0				
400	26	NL9 216	F	A	8.6	Y	+18	+18	7943	93	29.80	134					85.0	88.5	88.5	87.5	84.0	82.5	81.5	81.0
28	29	NL9 216M	F	M	8.6	N	+18	+18	11435	70	30.04	57	95.0	94.5	93.0	91.5	90.0	88.5						
81	3	NL9 216M	F	M	8.6	N	+18	+18	6729	79	29.92	75			88.0	87.5	87.0	86.0	85.5	84.5	83.5	82.5	81.5	
295	47	NL9 216M	C	M	8.6	N	+18	+18	12870	70	29.69	56		90.0	93.5	93.5	91.5	90.0	88.5	87.5	86.5	85.5	84.0	
339	46	NL9 216M	F	M	8.6	Y	+18	+18	14655	78	29.36	103	80.5											
27	29	NCX 228	F	A	8.5	Y	+ 9	+ 9	8437	70	30.13	57					88.0	87.5	86.0	85.0	84.5	84.0		
46	29	NCX 228	F	A	8.5	Y	+10	+10	10575	70	30.19	56					85.0	89.0	88.5	88.0	87.0	86.0	85.0	
220	28	NCX 228	F	A	8.5	Y	+13	+10	17034	77	29.31	116					86.0	87.0	86.3	85.5				
366	8	NCX 228	F	A	8.5	Y	+10	+10	12795	85	30.02	97						77.5	78.0					

TABLE J-I
(Continued)

OBS NO	LAB NO	MODEL CODE	EMCT	TRANS	CR	AIR	SPARK ADVANCE AS RCD	SPARK ADVANCE AS TST	ODOM MILES	AMB TMP	BARO	HUM	PRIMARY R F OCTANE NUMBER REQUIREMENTS, AT RPM 1000	1250	1500	1750	2000	2250	2500	2750	3000	3250	3500	3750
387	41	NCX 228	C	A	8.5	Y	+ 8	+10	12172	71	29.98	64							85.0	83.5				
399	26	NCX 228	F	A	8.5	Y	+10	+10	6741	92	30.00	136					84.0	87.0	85.5	84.0	83.0	81.5	80.0	
50	29	NC5 225	F	A	8.2	Y	+ 4	+ 4	9810	70	30.19	56					93.0	92.5	91.5	90.5	89.5	88.5		
263	7	NC5 225	F	A	8.2	Y	+ 4	+ 4	6200	71	30.47	61						85.6	90.0	89.5	88.4	86.9	85.0	
278	47	NC5 225	C	A	8.2	N	+ 4	+ 4	20100	70	29.74	62					94.0	97.0	96.0	95.0	94.0			
286	47	NC5 225	C	A	8.2	Y	+ 4	+ 4	12680	70	29.70	62					90.0	91.0	90.0	89.0	88.0	86.5	85.0	
45	29	NFH 450M	F	M	8.6	Y	+ 6	+ 5	8721	70	29.97	55					92.0	90.0	88.0	87.0	86.0			
372	41	NIA 238	C	A	8.0	Y	+14	+14	8800	70	29.92	62				87.5	89.5	89.0	88.0					
350	46	NIH 450	F	A	8.6	Y	+ 4	+ 6	7467	72	29.28	67		84.5	85.0	84.5	82.0							
1	40	NIJ 244	F	A	8.3	Y	+ 6	+ 6	10284	75	29.34	102				90.5	88.0	85.0	83.5	82.5				
34	29	NIK 238	F	A	8.6	Y	+ 6	+ 6	13104	70	29.98	62			89.0	88.0	86.0	85.0						
89	3	NIK 238	F	A	8.6	Y	+ 6	+ 6	8125	75	28.89	76							85.5	83.5	82.0	81.0	80.0	
187	4	NIK 238	F	A	8.6	N	+ 6	+ 6	5594	78	29.33	67			87.0	88.0	87.5	86.5	85.5	85.0	84.5	84.0	83.0	
268	7	NIK 238	F	A	8.6	Y	+ 5	+ 6	8560	70	30.46	61					88.8	87.5	85.8	84.1	83.0	81.9	81.0	
359	8	NIK 238	F	A	8.6	Y	+ 6	+ 6	6884	80	28.71	83				87.0	85.0							
405	26	NIK 238	F	A	8.6	Y	+ 6	+ 6	7865	99	29.90	86		91.0	90.0	89.0	87.5	85.5	84.0	83.0	82.0			
199	4	NS6 457	F	A	8.2	Y	+ 6	+ 6	6410	80	28.82	83					84.0	84.0	83.0	82.0	81.0	80.5	80.0	
223	28	NH 450	F	A	8.6	Y	+ 6	+ 6	12960	64	29.45	76	88.0	91.0	90.8	87.0	85.5	84.0	82.0	79.0				
224	28	NH 450	F	A	8.6	Y	+ 6	+ 6	12415	85	29.42	103			79.0	82.0	84.5	86.0	85.0	81.5				
275	47	NH 450	C	A	8.6	Y	+ 6	+ 6	6000	70	29.65	56			84.0	88.5	88.5	88.5	88.5	87.0	86.0	85.0	84.0	
111	5	NJ 244	F	A	8.3	Y	+ 6	+ 6	5274	70	30.22	61			85.0	90.0	91.0	88.5	87.5	86.5	85.0	84.0	83.0	
391	26	NJ 244	F	A	8.3	Y	+ 6	+ 6	6048	95	29.90	124	88.0	88.5	87.0	86.0	86.0	83.5	81.0					

TABLE J-I
(Continued)

OBS NO	LAB NO	MODEL CODE	EMCT	TRANS	CR	AIR	SPARK ADVANCE AS RCD	SPARK ADVANCE AS TST	ODOM MILES	AMB TMP	BARO	HUM	PRIMARY R.F. OCTANE NUMBER REQUIREMENTS, AT RPM 1000	1250	1500	1750	2000	2250	2500	2750	3000	3250	3500	3750
51	29	NK 238	F	A	8.6	Y	+ 6	+ 6	10360	70	30.11	58			88.0	90.0	87.5							
207	4	NK 238	F	A	8 6	Y	+ 6	+ 6	6449	82	29.12	107		81 0	83 5	84.0	83.5	83.0	82.0	81.0	79.5	78.5	77.5	
4	40	OL 216	F	A	8.8	N	+10	+10	10029	73	29.45	80			92.0	94.5	95.0	93.5	91.0	89.0	82.5	86.5	85.5	
12	22	OL 216	F	A	8.8	Y	+10	+10	9163	70	29.40	55			80.5	80.5	81.0	81.5	81.0	79.5	78.5	76.5	L	
35	29	OL 216	F	A	8.8	Y	+10	+10	10340	70	30.13	57			92.0	90.5	89.5	89.0	87.5	88.0	87.0			
105	5	OL 216	F	A	8.8	N	+10	+10	5850	73	30.18	60			89.0	90.0	91.0	90.0	89.0	88.0	87.0	85.5	84.0	
212	4	OL 216	F	A	8.8	Y	+10	+10	12486	77	29.11	54			88.0	89.0	88.5	88.5	88.0	87.5	87.0	86.5	86.0	85.5
227	28	OL 216	F	A	8.8	Y	+10	+10	8320	79	29.42	96			88.7	89.2	89.1	88.9	88.0	87.0	86.0	85.0	85.0	
383	41	OL 216	C	A	8.8	N	+ 9	+ 8	7500	82	29.96	66			91.0	92.0	91.7	91.0	90.0					
393	26	OL 216	F	A	8.8	Y	+10	+10	17710	88	30.02	133			92.0	92.0	92.0	91.0	89.0	87.0	86.0	85.5	85.0	84.5
406	26	OL 216	F	A	8.8	Y	+10	+10	7310	88	29.93	122		94.5	95.0	94.5	93.5	93.0	92.0	90.5	90.0	89.5	89.0	88.5
53	29	OL 216M	F	M	8.8	Y	+10	+10	12293	70	30.20	57	91.0	90.0	89.0	88.0	87.5							
80	3	OL 216M	F	M	8.8	N	+ 8	+10	8333	80	30.12	50			90.0	90.0	90.5	89.5	88.5	87.5	86.5	85.0	83.5	
204	4	OL 216M	F	M	8.8	N	+10	+10	6861	78	29.06	57	86.0	88.0	88.0	87.5	86.5	86.0	85.5	85.0	85.0	84.5	84.5	84.0
328	46	OL 216M	F	M	8.8	Y	+10	+10	14888	78	29.41	120			87.0	85.0	83.5	82.5						
388	41	OL 216M	C	M	8.8	N	+ 7	+10	8079	71	29.99	63			91.0	90.5	90.0	88.5	87.0					
33	29	OCA 133	F	A	8.8	Y	+10	+10	13028	70	30.13	57			92.0	91.0	89.5	88.0						
291	47	OCA 133	C	A	8.6	Y	+12	+10	6000	70	29.68	62		84.5	86.0	87.5	89.0	88.0	87.0	86.0	85.5	85.0	84.0	
396	26	OCA 133	F	A	8.6	Y	+10	+10	15856	93	29.94	134				85.0	85.0	83.5	82.5	81.5	80.0			
106	5	OCA 223	F	A	9.0	Y	+ 9	+12	12726	70	30.08	56						86.0	87.0	86.0	84.5	83.0	82.0	
211	4	OCA 223	F	A	9.0	Y	+12	+12	15450	75	29.22	81					88.5	90.0	89.0	87.5	87.0	86.0	86.0	
229	28	OCA 223	F	A	9.0	Y	+12	+12	11759	68	29.48	58				86.0	88.0	90.5	90.8	89.0				

TABLE J-I
(Continued)

OBS NO	LAB NO	MODEL CODE	EMCT	TRANS	CR	AIR	SPARK ADVANCE AS RCD	SPARK ADVANCE AS TST	ODOM MILES	AMB TMP	BARO	HUM	1000	1250	1500	1750	2000	2250	2500	2750	3000	3250	3500	3750
													PRIMARY R.F. OCTANE NUMBER REQUIREMENTS, AT RPM											
230	28	OCA 223	F	A	9.0	Y	+12	+12	12549	84	29.25	130					76.0	82.0	86.0	87.1	85.0	83.5		
231	28	OCA 223	F	A	9.0	Y	+12	+12	12925	85	29.42	103			76.0	80.5	83.5	91.5	91.0	90.5	87.5			
325	46	OCA 223	F	A	9.0	Y	+12	+12	8550	75	29.35	97						82.5	85.0	86.0	86.0	84.5	83.0	
326	46	OCA 223	F	A	9.0	Y	+12	+12	8760	75	29.09	91							88.0	87.5	86.5	85.5	85.0	
327	46	OCA 223	F	A	9.0	Y	+12	+12	9759	78	29.53	57					86.0	86.0	86.0	86.0				
329	46	OCA 223	F	A	9.0	Y	+12	+12	9684	76	29.73	78					84.0	85.0	85.0					
330	46	OCA 223	F	A	9.0	Y	+12	+12	8375	78	29.75	62						85.5	89.0	87.0				
331	46	OCA 223	F	A	9.0	Y	+12	+12	8324	75	29.30	81						89.0	92.0	89.0				
332	46	OCA 223	F	A	9.0	Y	+12	+12	8234	76	29.45	73					87.0	88.5	89.0	89.0				
413	26	DCA 223	F	A	9.0	Y	+12	+12	12494	77	29.80	111						85.5	91.0	91.0	89.5	89.0	88.0	87.0
25	29	OCB 133	F	A	8.6	Y	+10	+10	7483	70	30.24	59				89.0	88.0	86.5	85.5	85.0				
26	29	OCB 133	F	A	8.6	Y	+10	+10	9720	70	30.24	59				91.0	91.0	91.0	90.5	90.5	90.5	90.0	89.5	
210	4	OCB 133	F	A	8.6	Y	+10	+10	11608	77	29.25	92				85.5	87.0	85.5	85.0	84.0	83.5			
3	40	OCB 242	F	A	8.2	N	+10	+10	10038	75	29.52	82			84.0	87.5	88.0	85.5	84.0	83.0	82.0			
90	3	OCS 133	F	A	8.6	Y	+10	+10	8105	75	29.77	51						86.0	84.5	82.0	80.0	79.0	78.0	
374	41	OCS 223	C	A	9.0	Y	+12	+12	21900	70	30.10	68					82.0	84.5	85.5	86.0	86.0	85.5	85.0	84.0
96	3	OCS 223**	F	M	9.0	N	+ 4	+ 6	7181	70	29.99	45			97.0	97.0	96.0	95.0	94.0	92.0	90.0			
107	5	OI 242	F	A	8.2	Y	+10	+10	5576	72	29.90	49	91.0	91.0	90.0	88.5	87.5	85.5	84.0	82.5				
232	28	O V242	F	A	8.2	Y	+ 7	+ 7	13199	72	29.25	82		90.5	91.5	90.8	89.5	88.0						
397	26	O V250	F	A	8.4	Y	+ 8	+ 8	9470	101	29.94	121	90.5	88.5	87.5	85.0	82.0	81.0	80.0					
16	22	PL 217	F	A	8.2	Y	+10	+10	16592	70	29.18	62						83.0	82.5	82.0	81.5	80.5	79.5	
17	22	PL 217	F	A	8.2	Y	+10	+10	19328	70	29.12	61						84.5	85.0	84.5	83.5	82.5	82.0	

TABLE J-I
(Continued)

OBS NO	LAB NO	MODEL CODE	EMCT	TRNS	CR	AIR	SPARK ADVANCE AS RCD	AS TST	ODOM MILES	AMB TMP	BARO	HUM	PRIMARY R.F. OCTANE NUMBER REQUIREMENTS, AT RPM 1000	1250	1500	1750	2000	2250	2500	2750	3000	3250	3500	3750
40	29	PL 217	F	A	8.2	N	+10	+10	13092	70	30.10	55				80.0	84.0	84.0	83.5	83.0	82.0	81.0	79.5	76.0
200	4	PL 217	F	A	8.2	Y	+10	+10	19692	73	29.31	70					82.0	82.0	81.0	80.0	79.0	78.0	77.0	76.0
364	8	PL 217	F	A	8.2	Y	+10	+10	7906	84	29.98	68					76.0	78.5	78.0	77.0	75.5			
415	26	PL 217	F	A	8.2	Y	+10	+10	8816	71	30.15	67					83.0	85.0	86.0	84.5	83.5	82.5	82.0	81.0
100	5	PL 217M	F	M	8.2	N	+12	+12	8858	72	29.92	62		87.0	87.0	86.5	85.5	84.5	83.0	81.0	79.0			
255	7	PL 217M	F	M	8.2	N	+12	+12	9092	70	30.28	49			90.0	91.0	90.0	88.8	87.7	86.5	85.7	84.9	84.0	
368	41	PL 222	C	A	8.5	Y	+ 8	+10	15681	66	30.06	70				81.5	84.0	85.0	85.5	85.5	85.5	84.5	83.5	
13	22	PC 222	F	A	8.5	Y	+10	+10	12895	70	29.23	60				82.5	81.0	80.0	79.5	79.0	78.5	78.0	77.0	
54	29	PC 222	F	A	8.5	Y	+10	+10	13244	70	30.02	56					91.0	89.5	88.5	87.5	86.0			
101	5	PC 222	F	A	8.5	N	+10	+10	9712	72	29.77	58			77.5	79.5	83.0	79.5	78.5	78.0	78.0	78.0		
194	4	PC 222	F	A	8.5	Y	+10	+10	10164	78	28.75	67				80.0	80.0	80.0	79.5	78.5	78.0			
249	7	PC 222	F	A	8.5	Y	+10	+10	12213	70	30.20	48				83.5	86.2	87.9	88.6	86.3	84.8	83.5	83.0	
261	7	PC 222	F	A	8.5	Y	+ 8	+ 7	5743	70	29.92	60							88.7	88.3	86.1	85.0	84.0	83.4
282	47	PC 222	C	A	8.5	Y	+10	+10	12950	70	29.61	64				86.5	86.5	85.0	84.0	83.0	82.0	81.0	80.0	
283	47	PC 222	C	A	8.5	Y	+12	+10	12450	70	29.74	60			84.0	86.5	88.0	86.5	85.5	85.0	84.0	82.5	80.0	
333	46	PC 222	F	A	8.5	Y	+10	+10	8845	76	29.70	56					80.0	82.0	80.0					
337	46	PC 222	F	A	8.5	Y	+10	+10	8514	76	29.61	70					78.0	82.0	81.0					
338	46	PC 222	F	A	8.5	Y	+10	+10	8933	76	29.81	61					83.0	82.0	81.0	80.5				
346	46	PC 222	F	A	8.5	Y	+10	+10	9146	76	29.18	101				80.5	82.0	82.0	81.0					
347	46	PC 222	F	A	8.5	Y	+11	+11	8680	74	29.28	83				84.0	84.0	83.0	82.0					
356	46	PC 222	F	A	8.5	Y	+10	+10	8965	67	29.50	66					80.0	78.0						
411	26	PC 222	F	A	8.5	Y	+10	+10	28458	86	30.00	139				85.5	88.0	86.5	86.0	84.0	82.5	81.5	81.0	80.0

TABLE J-I
(Continued)

OBS NO	LAB NO	MODEL CODE	EMCT	TRANS	CR	AIR	SPARK ADVANCE AS RCD	SPARK ADVANCE AS TST	ODOM MILES	AMB TMP	BARO	HUM	PRIMARY R F OCTANE NUMBER REQUIREMENTS, AT RPM 1000	1250	1500	1750	2000	2250	2500	2750	3000	3250	3500	3750
412	26	PC 222	F	A	8.5	Y	+10	+10	30109	80	29.90	136				87.0	86.0	85.5	85.0	84.5	80.0			
85	3	PC 226	F	A	8.2	Y	+ 9	+ 7	9728	79	29.92	92			85.0	84.5	82.5							
102	5	PC 226	F	A	8.2	N	+10	+ 7	6823	70	29.93	61					86.0	86.0	83.5	82.5	82.0	81.0	80.0	
239	28	PC 226	F	A	8.2	Y	+ 7	+ 7	11870	69	29.32	71					80.0	82.0	84.8	86.0	86.0	83.0		
392	26	PC 226	F	A	8.2	Y	+ 7	+ 7	7500	80	29.88	124				84.5	89.5	90.0	89.5	88.5	84.0	82.5	80.0	
99	3	RL 225M	F	M	8.3	N	+10	+10	7997	72	29.94	50		91.0	90.5	89.5	88.0	86.5	85.0	83.0	81.0			
208	4	RC 242	F	A	8.3	N	+ 5	+ 5	6800	79	29.03	101			83.5	85.0	84.5	82.5	80.0					
240	28	RC 242	F	A	8.3	Y	+ 6	+ 6	12434	69	29.50	67			82.0	86.0	84.9	82.0	74.0					
241	28	RC 242	F	A	8.3	Y	+ 6	+ 6	17347	66	29.48	78		80.0	88.0	87.5	85.2	82.5	77.0					
395	26	S F50	F	A	8.4	Y	+20	+20	7570	90	29.94	126	92.0	90.5	90.0	90.0	89.5	88.5	88.0	85.5	84.0	83.0	82.0	
32	29	KT 137M	F	M	8.4	N	+ 6	+ 6	12801	70	29.95	56				91.5	89.5	88.5	87.5	86.5				
414	26	KV 252	F	A	8.5	Y	+16	+16	34380	87	30.00	124			87.0	89.5	89.0	88.0	87.5	87.0	85.5	83.5		
260	7	NTLD 241	F	A	8.3	N	+ 8	+10	7107	72	30.10	61			86.0	88.5	91.0	93.1	90.5	87.9	85.6	83.6	82.0	
352	46	NTLD 241M	F	M	8.3	N	+10	+10	15944	75	29.28	76	86.0	86.0	86.0	86.0	86.0	86.0						
417	26	NTLG 250	F	A	8.5	Y	+ 6	+ 8	6594	81	30.07	88		94.0	93.0	92.0	93.0	91.0	89.0	88.5	87.0	85.5		
188	4	NTLH 450	F	A	8.6	Y	+ 5	+ 5	7722	69	29.30	33			86.0	88.5	90.0	90.0	88.5	87.5	86.5	85.5	84.5	
122	5	NVLD 241	F	A	8.3	N	+ 8	+ 8	6935	71	30.02	50				92.5	93.0	92.0	90.5	89.5	89.0	88.5	88.0	
10	22	OT 149M	F	M	8.9	N	+ 6	+ 6	8543	73	29.99	70		85.5	85.0	83.5	83.5	83.5	83.5	85.0	85.0	85.0	84.0	82.5
198	4	OT 149M	F	M	8.9	Y	+ 6	+ 6	6832	72	28.94	86	90.5	90.0	89.0	88.0	87.0	86.5	85.0	84.0	83.0	81.5	80.5	
390	41	OT 149M	C	M	8.9	N	+ 6	+ 6	9800	66	30.02	62	92.5	94.5	95.0	94.0	90.0							
22	22	OT 250	F	A	8.4	Y	+ 8	+ 8	15746	70	29.33	50		85.5	90.0	88.5	87.0	85.5	84.0	82.5	80.5	78.5	76.0	
123	5	OT 250	F	A	8.4	Y	+ 4	+ 8	5800	69	30.20	58	84.0	87.0	89.0	88.5	86.0	85.0	84.5	84.0	84.0	84.0		

TABLE J-I
(Continued)

OBS NO	LAB NO	MODEL CODE	EMCT	TRANS	CR	AIR	SPARK ADVANCE AS RCD	SPARK ADVANCE AS TST	ODOM MILES	AMB TMP	BARO	HUM	1000	1250	1500	1750	2000	2250	2500	2750	3000	3250	3500	3750
													PRIMARY R.F. OCTANE NUMBER REQUIREMENTS, AT RPM											
126	5	OV 149	F	A	8.9	Y	+10	+10	8616	72	30.13	58			88.0	90.5	92.0	91.5	89.5	88.5	88.0			
250	7	PV 452	F	A	8.5	Y	+ 8	+ 9	16679	70	29.98	47			77.7	79.8	81.0	81.0	78.4	77.1	L			
93	3	B F17M	F	M	8.2	N	0	0	8786	80	29.81	106			86.0	86.0	85.5	85.0	84.0	83.5	82.5	81.5	80.5	
121	5	CH 226	F	A	8.2	N	+ 7	+ 7	11265	69	30.02	54					86.0	86.0	81.0	79.0	78.5	78.0		
377	41	CP 114M	C	M	8.8	N	+ 5	+ 5	6770	66	29.98	62			88.0	89.0	89.2							
112	5	CP 216	F	A	8.5	Y	+ 2	+ 5	6977	71	29.92	68					87.0	87.0	86.5	85.5	85.0	84.0	84.0	83.5
293	47	CP 216	C	A	8.5	Y	+ 5	+ 5	6026	70	29.68	60				85.5	87.0	87.0	87.0	86.5	86.5	86.0	85.0	
382	41	E 212M	C	M	8.5	N	+ 7	+ 7	9187	72	30.02	64			85.0	90.0	89.5	89.0	87.5	88.0	85.0			
29	29	E 215	F	A	8.9	Y	+ 5	+ 5	10272	70	30.24	57					88.0	93.0	93.0	92.5	92.0	89.5	88.0	
30	29	E 215	F	A	8.9	Y	+ 5	+ 5	8373	70	30.24	57						87.0	85.0	84.0	83.0	82.0		
402	26	E 215	F	A	8.9	Y	+ 5	+ 5	7091	90	30.01	132						88.5	88.5	88.5	88.0	86.5	83.0	80.5
20	22	E 215M	F	M	8.9	N	+ 3	+ 5	6230	70	29.31	52	93.5	93.0	92.5	92.5	92.0	92.0	91.5	90.0	88.0	86.5	86.0	
98	3	E 215M	F	M	8.9	Y	+ 5	+ 5	6138	64	30.00	35			93.0	92.5	92.5	92.0	91.0	90.0	88.5	86.0		
189	4	E 215M	F	M	8.9	N	+ 2	+ 5	11909	66	29.20	42	90.0	90.0	90.0	90.0	89.5	89.5	89.0	88.5	88.0	87.5	87.0	86.0
298	47	E 215M	C	M	8.9	N	+ 3	+ 5	17453	70	29.70	56							96.0	98.0	98.0	97.5	96.0	
244	28	E 220	F	A	8.5	Y	+ 6	+ 6	11775	74	29.31	79					86.0	87.0	87.0	84.0	82.8	81.0	79.9	78.5
243	28	E 220M	F	M	8.5	Y	+ 7	+ 6	12933	68	29.30	79			89.0	90.0	89.5	88.5	88.0	87.0	86.5	86.0		
373	41	E 220M	C	M	8.5	N	+ 6	+ 6	10490	70	30.10	93				85.0	86.0	88.5	87.0	87.0	86.5	86.0	85.0	84.0
2	40	E F20	F	A	8.5	N	+ 8	+ 8	7610	72	29.56	77					80.0	83.0	86.0	89.0	88.5	87.5	86.0	84.5
15	22	E F20	F	A	8.5	Y	+ 6	+ 6	12503	70	29.27	80					86.0	86.5	87.0	87.0	86.5	86.0	85.5	
118	5	E F20M	F	M	8.5	Y	+ 3	+ 6	5022	70	30.15	52	96.0	96.0	95.0	93.5	91.0	88.5	86.5	85.0	84.5	84.0	84.0	
290	47	E F20M	C	M	8.5	Y	+ 8	+ 6	10305	70	29.82	60			89.0	89.5	90.0	90.5	93.0	93.0	93.0	90.0	89.0	

TABLE J-I
(Continued)

OBS NO	LAB NO	MODEL CODE	ENG CT	TRANS	CR	AIR	SPARK ADVANCE AS RCD	SPARK ADVANCE AS TST	ODOM MILES	AMB TMP	BARO	HUM	PRIMARY R.F. OCTANE NUMBER REQUIREMENTS, AT RPM 1000	1250	1500	1750	2000	2250	2500	2750	3000	3250	3500	3750
39	29	J 313M	F	M	8.8	N	+ 6	+ 6	6824	70	30.02	56					86.0	86.0	85.5	85.0	84.5	83.5	82.0	
279	47	J 313M	C	M	8.8	Y	+ 2	+ 2	6000	70	29.78	62			85.0	85.0	85.0	84.5	84.0	82.0	81.0	79.5	78.0	
381	41	J 313M	C	M	8.8	N	+ 2	+ 2	9720	71	29.90	60			87.0	87.0	86.7	86.5	85.8	85.0				
87	3	J 315M	F	M	8.8	N	+ 4	+ 4	10643	75	30.02	81					81.5	81.0	80.0	79.0	78.0	77.0	75.5	
196	4	J 315M	F	M	8.8	N	+10	+10	6982	79	29.00	60	85.0	90.0	93.0	92.5	91.5	90.5	89.0	88.0	86.5	85.0	83.0	
48	29	J 318	F	A	8.8	Y	0	0	11777	70	30.04	58							H	H	98.0	95.0	92.0	
120	5	J 318M	F	M	8.8	Y	0	0	4818	70	30.15	52		83.0	84.0	83.0	82.5	81.5	81.0	81.0	80.5	80.5	80.0	
242	28	J 318M	F	M	8.8	Y	0	0	17345	71	29.50	47				91.0	92.0	92.8	94.0	94.5				
259	7	J 318M	F	M	8.8	N	0	0	7190	70	29.78	44					90.0	91.9	92.0	91.7	89.6	87.6	86.0	
289	47	J 318M	C	M	8.8	Y	+ 2	0	14760	70	29.80	60	88.0	89.0	89.0	89.0	88.0	88.0	87.5	87.5	87.0	86.0	85.0	
195	4	Q 216M	F	M	9.0	N	+ 8	+ 8	5804	86	29.14	49	85.0	88.5	89.0	88.5	88.5	88.0	87.5	87.0	86.0	85.5	84.5	83.5
8	40	Q 218M	F	M	8.7	N	+ 8	+ 8	7376	86	29.32	140					85.0	89.0	89.0	88.0	87.0	86.0	84.0	82.5
19	22	Q 218M	B	M	8.7	N	+ 8	+ 8	6490	70	29.16	60	87.5	87.0	86.5	86.0	84.5	83.5	83.0	82.5	82.5	82.5	82.0	
41	29	Q 218M	F	M	8.7	Y	+10	+10	9549	70	30.02	56							85.0	85.0	85.0	84.0	82.0	
186	4	T 213M	F	M	9.0	N	+ 8	+ 8	12337	68	29.39	43	84.0	85.0	85.5	86.0	85.5	85.0	84.5	83.5	83.0	82.5	82.0	
277	47	T 213M	C	M	9.0	Y	+10	+ 8	6010	70	29.74	54			80.0	81.0	84.0	84.0	83.5	83.0	83.0	82.5	82.0	80.0
367	8	T 213M	F	M	9.0	N	+20	+ 8	6950	80	30.00							83.5	85.5	86.0	85.0	84.0		
36	29	T 215	F	A	9.0	N	+ 5	+ 5	11163	70	30.10	59								89.0	86.0	86.5	85.0	
272	47	T 215	C	A	9.0	Y	+ 5	+ 5	6900	70	29.70	50					78.0	80.0	80.0	80 ^	80.0	78.5	78.0	76.5
9	40	T 215M	F	M	9.0	N	+ 5	+ 5	5408	66	29.50	82				90.5	90.0	88.5	87.0	85.0	81.5			
334	46	T 215M	F	M	9.0	Y	+ 5	+ 5	8532	80	29.68	94				89.0	88.0	87.5	86.5	86.0	85.0	84.5		
389	41	T 215M	C	M	9.0	N	+ 7	+ 5	6250	71	29.98	60			89.0	88.5	86.0							

TABLE J-I
(Continued)

OBS NO	LAB NO	MODEL CODE	EMCT	TRANS	CR	AIR	SPARK ADVANCE AS RCD	SPARK ADVANCE AS TST	ODOM MILES	AMB TMP	BARO	HUM	1000	1250	1500	1750	2000	2250	2500	2750	3000	3250	3500	3750
													PRIMARY R.F. OCTANE NUMBER REQUIREMENTS, AT RPM											
11	22	T 218	F	A	9.0	Y	+ 7	+ 7	7935	70	29.31	50						76.5	79.0	81.0	80.5	80.5	80.0	
43	29	T 218	F	A	9.0	Y	+ 7	+ 7	14050	70	30.24	57					87.0	92.0	91.0	89.5	88.0	87.5	87.0	
44	29	T 218	F	A	9.0	Y	+ 8	+ 8	12051	70	30.24	57						88.0	87.5	87.0	86.0	85.0	84.0	
205	4	T 218	F	A	9.0	Y	+ 4	+ 7	7276	81	28.99	77					86.5	88.0	88.0	88.0	87.5	87.0	86.5	86 0
216	28	T 218	F	A	9.0	Y	+ 8	+ 8	22045	54	29.42	40					84.8	86.0	89.0	86.5	84.5			
248	28	T 2[illegible]	F	A	9.0	Y	+ 7	+ 7	22192	53	29.42	35					86.0	88.5	89.5	88.5	87.5	85.5	83.0	81.5
408	26	T 218	F	A	9.0	Y	+ 7	+ 7	6194	85	30.23	48					87.0	88.0	88.0	88.0	88.0	88.0	88.5	88.0
88	3	T 218M	F	M	9.0	Y	+ 7	+ 7	7251	80	29.82	98				90.0	89.0	88.0	87.0	86.0	84.5	82.0		
117	5	T 218M	F	M	9.0	Y	+ 7	+ 7	8533	71	29.69	59			86.0	85.0	84.5	84.0	83.0	83.0	82.5	82.0		
257	7	T 218M	F	M	9.0	N	+ 7	+ 7	10633	71	30.10	42					91.1	92.0	92.4	92.2	91.6	90.8	89.9	88.9
280	47	T 218M	C	M	9.0	Y	+ 8	+ 8	15200	70	29.61	56		84.0	89.0	89.0	88.0	87.0	86.0	85.5	85.0	84.5	84.0	
386	41	T 218M	C	M	9.0	N	+ 7	+ 7	10840	70	29.84	62			88.0	89.5	89.5	89.0	88.0					
246	28	T 224	F	A	9.0	Y	+ 8	+ 8	12341	76	29.34	112					86.5	87.5	88.0	88.5	87.6	86.4		
247	28	T 224	F	A	9.0	Y	+ 8	+ 8	16984	85	29.48	121						86.0	86.0	86.0	84.5	83.5	82.0	
118	5	T 224M	F	M	9.0	Y	+ 8	+ 8	7206	70	30.02	56	93.0	93.0	92.0	87.5	87.0	86.0	85.0	84.5	83.5	82.0	81.0	80.0
206	4	T 224M	F	M	9.0	Y	+ 8	+ 8	6665	87	29.01	77	90.0	91.0	90.5	90.0	89.5	88.5	87.5	86.5	85.5	84.5	83.5	82.5
245	28	T 224M	F	M	9.0	Y	+ 9	+ 9	13250	75	29.31	108		88.0	91.0	90.6	90.1	89.5	88.5	87.3	86.0	84.7		
287	47	T 224M	C	M	9.0	Y	+ 5	+ 8	8650	70	29.58	54	86.0	89.0	89.0	85.5	85.0	84.5	84.0	83.5	83.0	82.0	80.0	
385	41	T 224M	C	M	9.0	Y	+ 8	+ 8	8546	61	29.92	56			89.0	91.5	92.0	91.0	89.5					
38	29	V F28M	F	M	8.6	Y	+ 8	+ 8	11533	70	29.98	60			86.0	89.0	88.0	87.0	86.5	86.0	85.5	85.0	84.0	
21	22	Y 214M	F	M	8.8	N	+ 3	+ 3	5292	70	29.32	51	89.0	88.5	88.0	87.5	87.0	86.0	85.0	84.0	83.0	80.5	78.5	
5	40	Z 215	F	A	9.0	N	+ 8	+ 8	13508	73	29.46	95					84.0	85.0	85.0	85.0	84.0	83.0	82.0	80.5

TABLE J-I
(Continued)

OBS NO	LAB NO	MODEL CODE	E M C T	T R A N S	CR	A I R	SPARK ADVANCE AS RCD	SPARK ADVANCE AS TST	ODOM MILES	AMB TMP	BARO	HUM	PRIMARY R.F. OCTANE NUMBER REQUIREMENTS, AT RPM 1000	1250	1500	1750	2000	2250	2500	2750	3000	3250	3500	3750
18	22	Z 215M	F	M	9.0	N	+ 6	+ 8	7392	70	29.12	62		84.5	86.0	85.0	83.5	83.0	82.5	82.0	81.5	81.0	80.5	
262	7	Z 215M	F	M	9.0	N	+ 8	+ 8	25173	72	30.18	44					88.2	89.2	89.0	87.8	86.5	85.4	84.2	
297	47	Z 215M	C	M	9.0	Y	+ 8	+ 8	9200	70	29.80	64	80.0	81.5	82.5	82.5	82.5	82.0	81.0	80.0	79.0	77.5		
369	41	Z 215M	C	M	9.0	N	+ 8	+ 8	6460	71	30.00	64			91.0	91.0								
292	47	CRT 220	C	A	8.6	Y	+ 8	+ 6	14810	70	29.60	57					86.0	86.5	87.0	87.5	87.5	87.0	86.0	86.0
125	5	CRT 220M	F	M	8.6	N	+ 5	+ 8	12068	69	29.98	46	98.0	97.0	96.0	95.0	94.5	93.5	93.0	92.5	92.0			
124	5	ET 222M	F	M	8.5	Y	+ 3	+ 5	10410	70	30.11	52	97.0	96.5	96.0	95.0	94.5	94.0	93.5	93.5	93.0			
31	29	TT 224M	F	M	9.0	N	+ 8	+ 8	5294	70	30.11	56	91.5	93.0	91.5	90.5	89.5	88.5	88.0	87.5	87.0			
97	3	TT 224M	F	M	9.0	N	+ 8	+ 8	6773	63	29.95	52			91.0	91.0	90.5	89.5	89.0	88.0	87.0	85.5	84.5	
375	41	TT 224M	C	M	9.0	N	+ 8	+ 8	6025	64	29.90	55				84.5	86.0	88.5	88.5	88.5	87.5	86.0		
37	29	YUT 218M	F	M	8.5	N	+ 6	+ 6	11423	70	29.95	57				87.0	86.5	86.0	85.0	84.0	83.0	82.0		
800	5	NL9 216	F	A	8.6	N	+18	+18	3976	70	29.88	48					82.0	87.0	88.0	86.5	85.0	83.5	83.0	82.0
801	8	IIA 238	F	A	8.0	Y	+15	+15	3703	85	29.73	75				90.5	88.0							
802	8	LIA 238	F	A	8.0	Y	+15	+15	3764	95	29.61	105			88.0	85.5	83.0							
803	8	BA F17	F	A	8.2	Y	+ 7	+ 7	2311	85	29.74	76							77.5	78.0	77.5			
804	8	T 218	F	A	9.0	Y	+ 7	+ 7	3299	84	29.84	88							85.0	85.0	84.0			
805	26	O V250	F	A	8.4	Y	+ 8	+ 8	10747	99	30.08	124	92.5	90.5	86.0	85.0	84.0	83.0	82.0	81.5	81.0	80.5	80.0	

TABLE J-II

SPEED RANGE CALCULATED DATA

1981 SELECT MODELS - 50% SATISFACTION

		Engine RPM											
		1000	1250	1500	1750	2000	2250	2500	2750	3000	3250	3500	3750
HIA 238	50% Sat.	-	-	-	86.9	87.2	85.6	84.6	84.2	83.5	82.3	-	-
	SD	-	-	-	2.2	1.3	1.4	1.2	0.8	1.1	1.7	-	-
	N	-	-	-	7	10	9	8	5	4	4	-	-
IIA 238/LIA 238	50% Sat.	-	-	88.1	88.5	88.1	87.0	85.7	85.3	84.0	82.3	81.7	-
	SD	-	-	3.2	2.1	2.6	3.0	3.4	2.5	2.3	2.2	2.6	-
	N	-	-	11	15	17	17	16	12	11	6	5	-
NCX 228/HCX 228/ ICX 228/LCX 228	50% Sat.	-	-	-	-	84.0	84.7	84.1	83.4	82.4	81.6	80.5	-
	SD	-	-	-	-	3.0	3.8	2.8	2.3	2.2	2.4	2.9	-
	N	-	-	-	-	8	9	12	13	11	9	6	-
NC5 225/HC5 225/ IC5 225/LC5 225	50% Sat.	-	-	-	84.0	87.4	88.5	88.9	88.8	88.0	86.9	85.0	82.9
	SD	-	-	-	4.9	4.2	3.6	3.3	3.3	3.3	2.6	2.0	3.0
	N	-	-	-	4	11	16	17	15	14	11	10	4
OL 216/ML 216	50% Sat.	-	-	89.5	90.1	90.2	89.8	88.7	87.5	86.4	85.6	86.1	86.9
	SD	-	-	3.7	3.8	3.8	3.3	3.1	3.3	3.3	3.9	2.2	2.2
	N			11	11	11	11	11	10	10	9	8	4
OL 216M/ML 216M	50% Sat.	-	-	89.6	88.4	87.8	86.8	86.4	85.2	84.2	-	-	-
	SD	-	-	2.0	2.6	2.7	2.6	1.8	1.8	1.7	-	-	-
	N	-	-	7	8	8	7	6	5	5	-	-	-
OCA 223/MCA 223	50% Sat.	-	-	-	-	84.4	86.5	88.1	87.8	86.8	86.4	84.6	-
	SD	-	-	-	-	4.1	3.1	2.6	1.7	1.6	2.0	2.2	-
	N	-	-	-	-	8	13	14	13	8	7	6	-
PL 217/KL 217	50% Sat.	-	-	-	-	81.6	82.9	82.3	81.7	80.9	81.4	80.4	78.7
	SD	-	-	-	-	2.9	2.0	2.7	2.4	2.7	1.9	2.1	2.7
	N	-	-	-	-	6	8	9	9	9	7	7	5
PC 222/KC 222	50% Sat.	-	-	81.4	83.5	83.7	83.5	83.6	83.3	82.2	81.6	81.0	-
	SD	-	-	2.9	2.5	3.5	3.4	3.4	3.3	3.1	2.7	2.9	-
	N	-	-	4	14	21	21	20	16	15	11	9	-

FIGURE J-1

PRF SPEED RANGE OCTANE NUMBER REQUIREMENTS

1981 Select Model: HIA 238

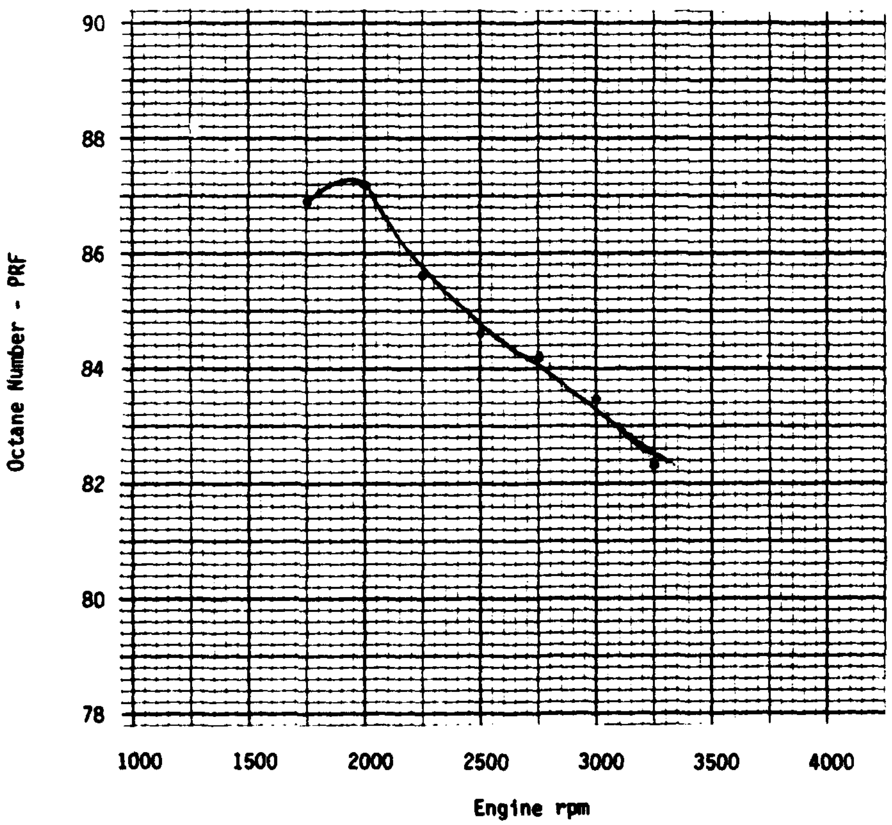


FIGURE J-2

PRF SPEED RANGE OCTANE NUMBER REQUIREMENTS

1981 Select Model: IIA 238
LIA 238

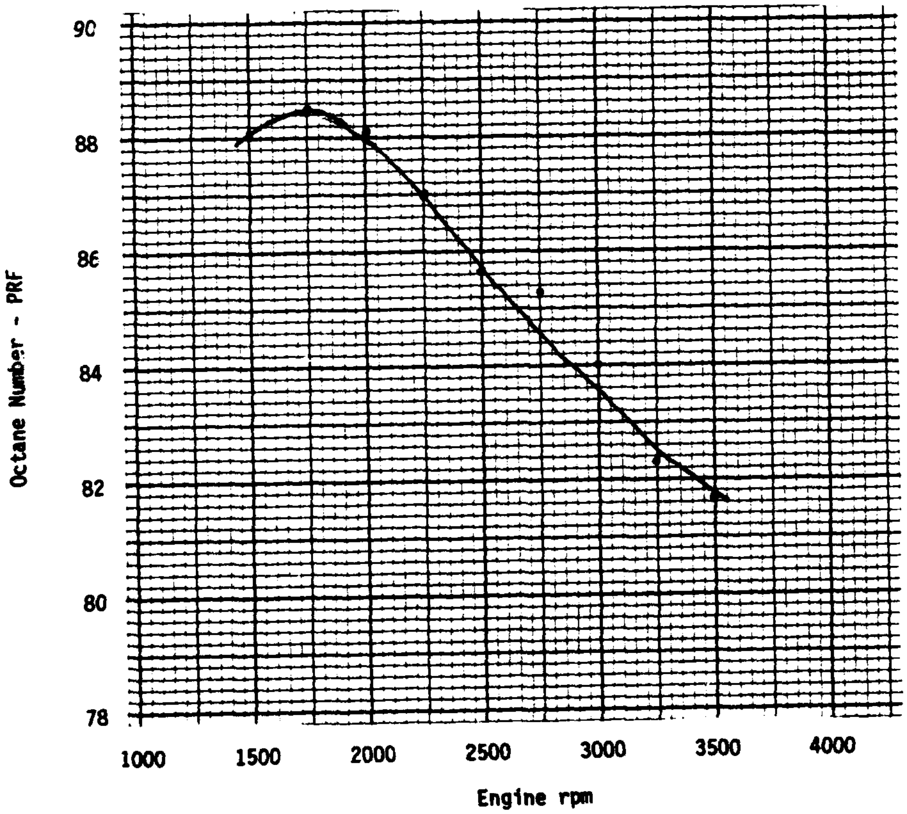


FIGURE J-3

PRF SPEED RANGE OCTANE NUMBER REQUIREMENTS

1981 Select Model: NCX 228
HCX 228
ICX 228
LCX 228

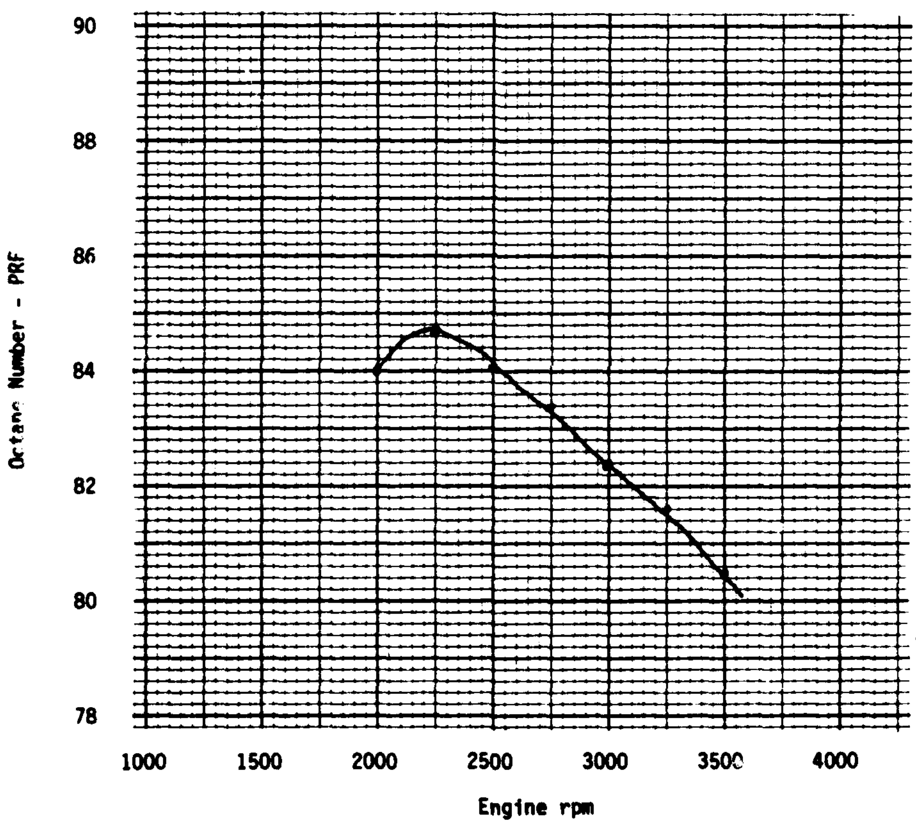


FIGURE J-4

PRF SPEED RANGE OCTANE NUMBER REQUIREMENTS

1981 Select Model: NC5 225
HC5 225
IC5 225
LC5 225

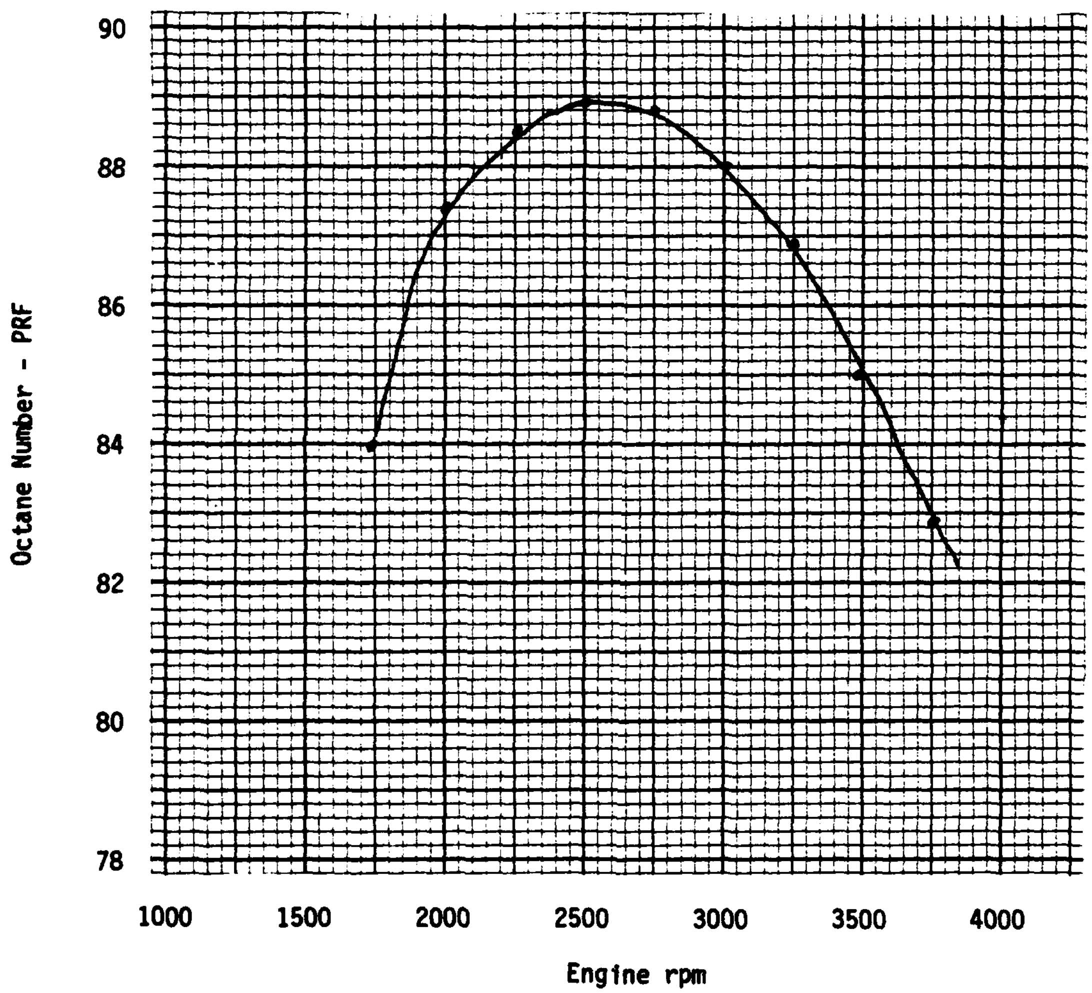


FIGURE J-5

PRF SPEED RANGE OCTANE NUMBER REQUIREMENTS

1981 Select Model: OL 216
ML 216

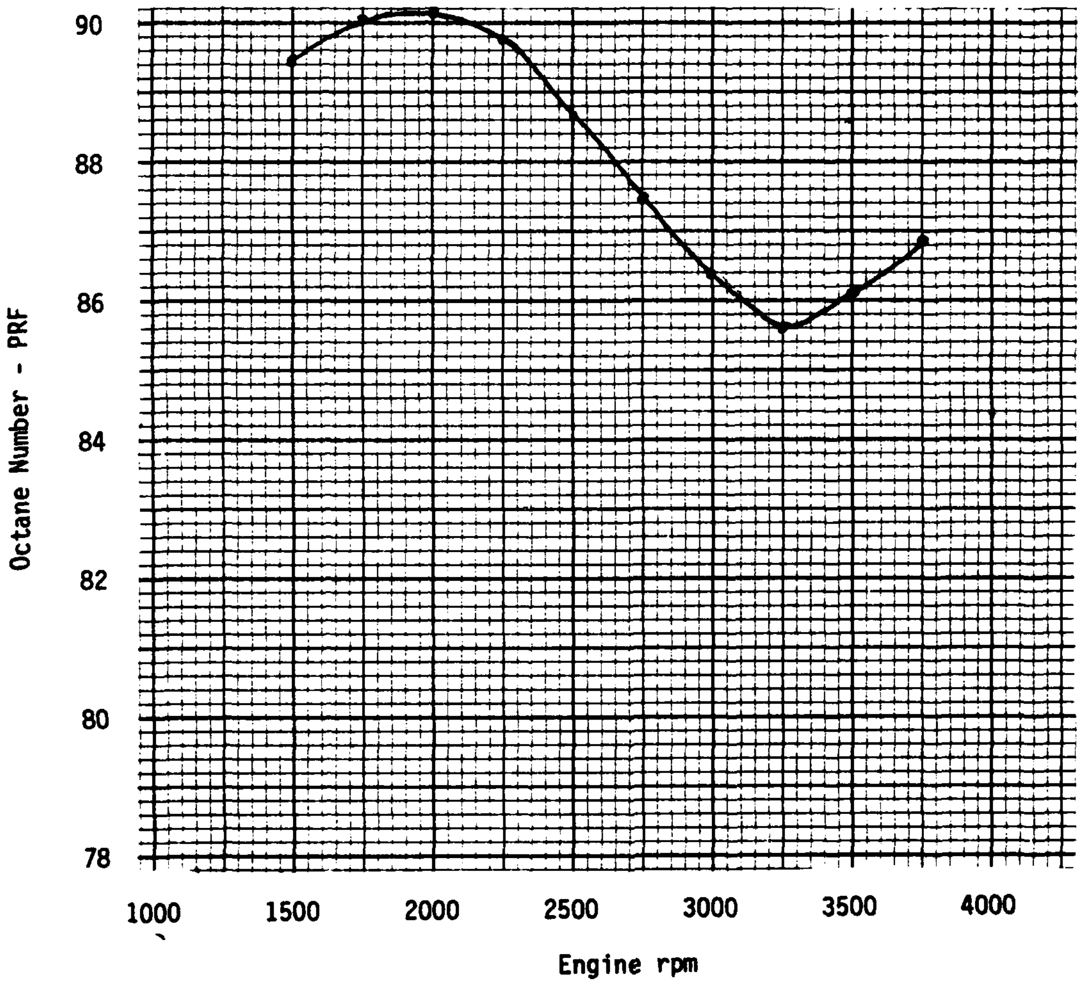


FIGURE J-6

PRF SPEED RANGE OCTANE NUMBER REQUIREMENTS

1981 Select Model: OL 216M
ML 216M

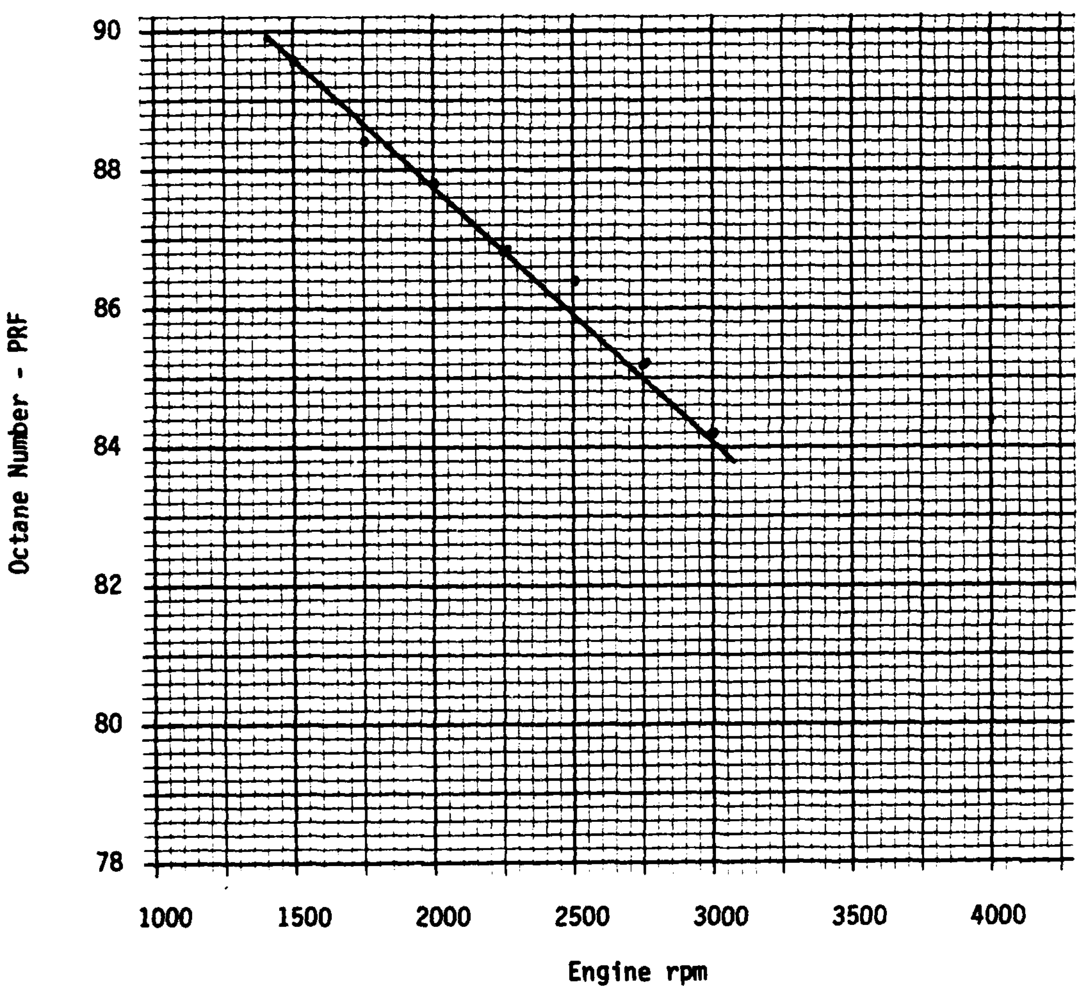


FIGURE J-7

PRF SPEED RANGE OCTANE NUMBER REQUIREMENTS

1981 Select Model: OCA 223
MCA 223

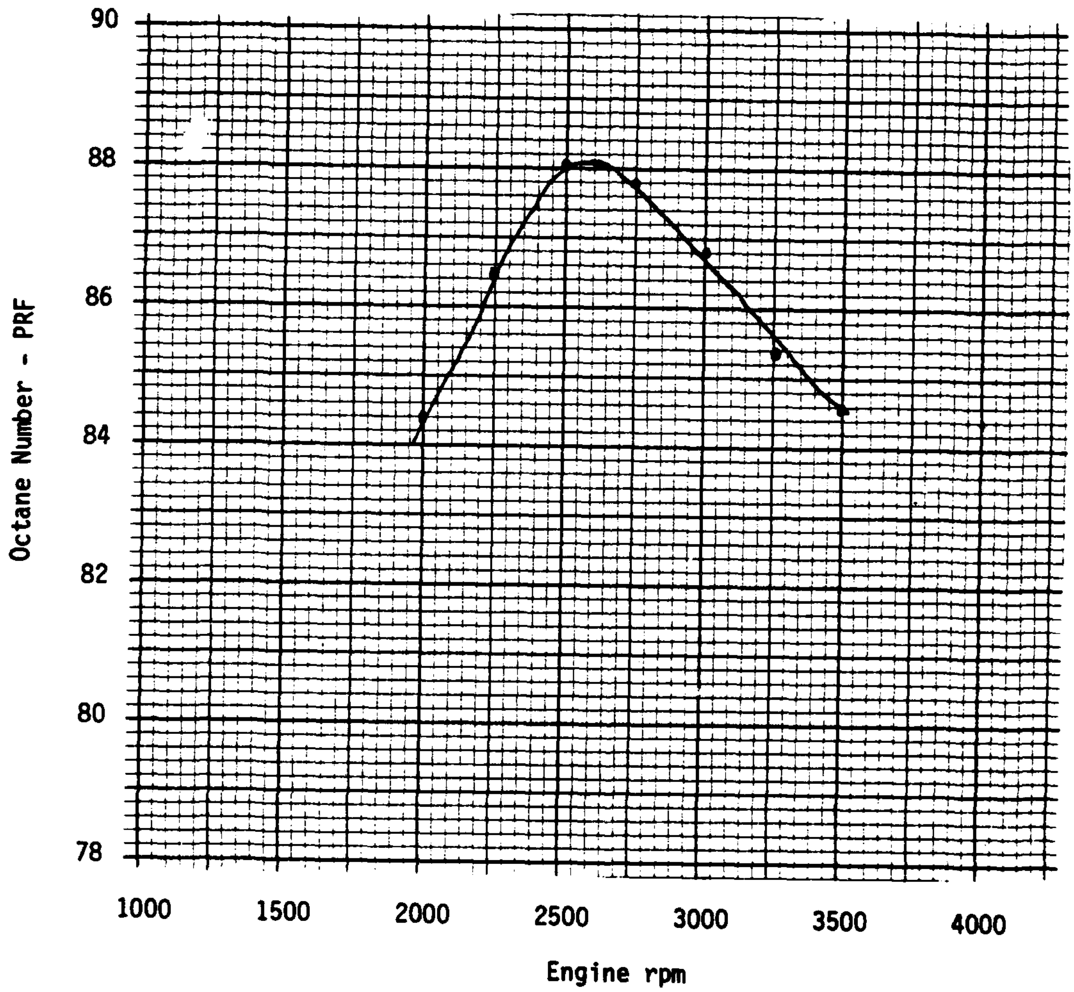


FIGURE J-8

PRF SPEED RANGE OCTANE NUMBER REQUIREMENTS

1981 Select Model: PL 217
KL 217

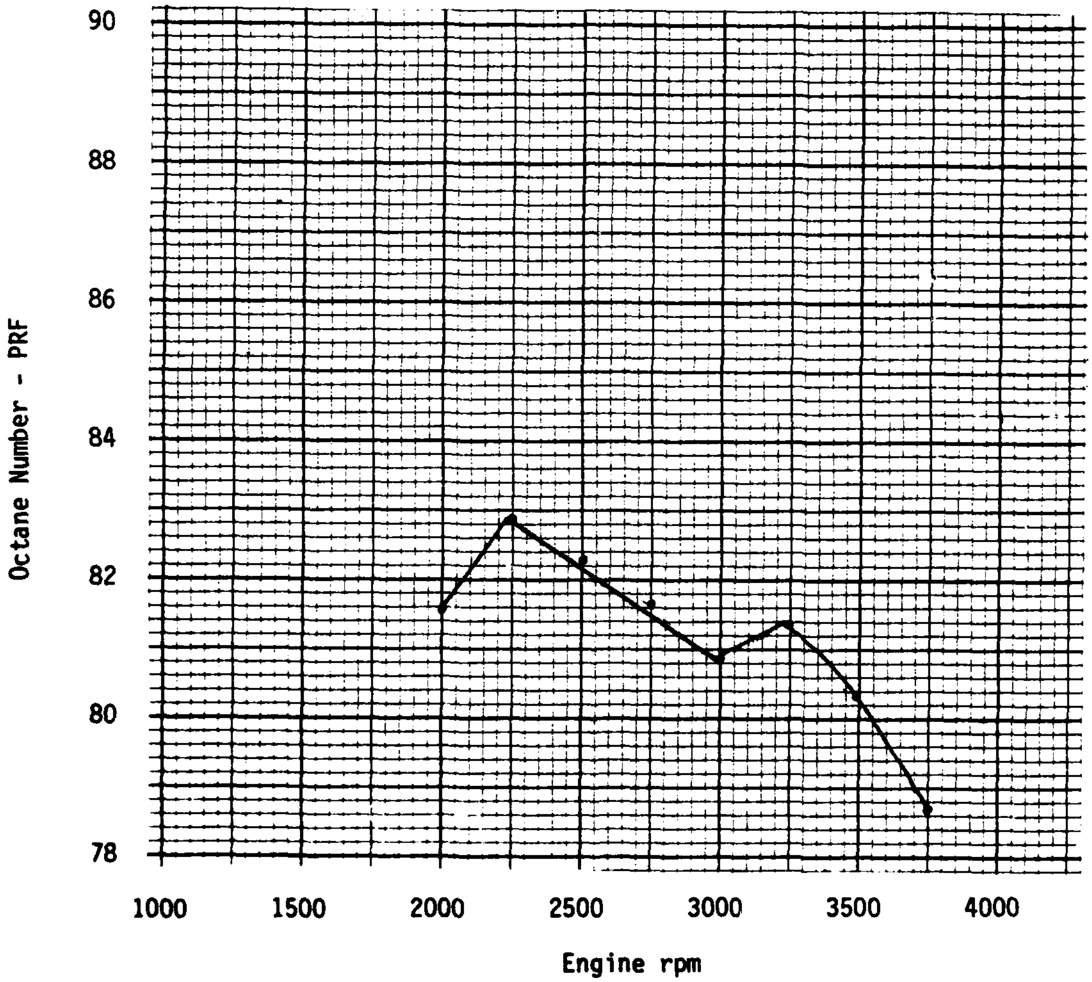
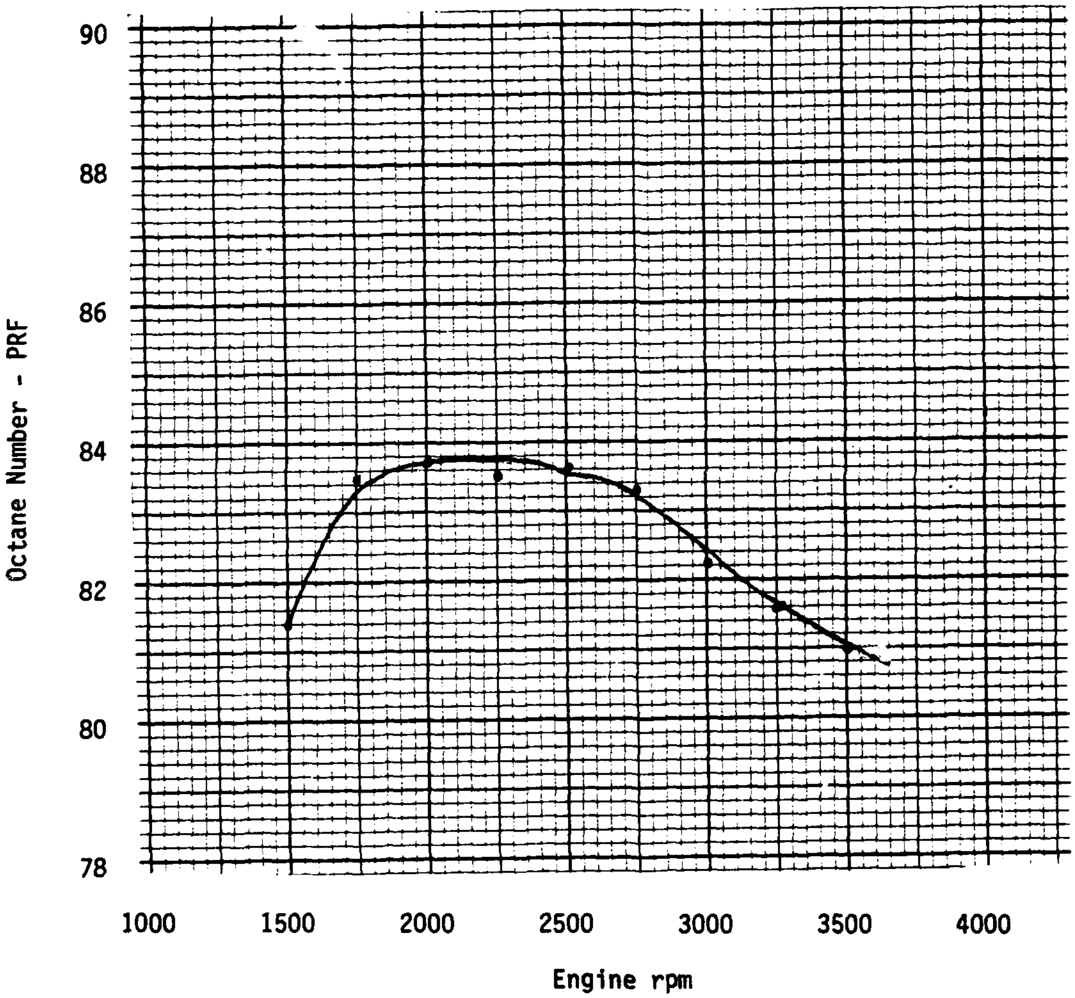


FIGURE J-9

PRF SPEED RANGE OCTANE NUMBER REQUIREMENTS

1981 Select Model: PC 222
KC 222



APPENDIX K

GEAR POSITION FOR
MAXIMUM OCTANE NUMBER REQUIREMENTS

TABLE K-I

THROTTLE/GEAR POSITION FOR 1981 MAXIMUM
FBRU OCTANE NUMBER REQUIREMENTS

Throttle Position	Gear	No. of Vehicles	% of Vehicles
Automatic Transmission			
Full	Highest (Drive)	216	69
	Passing	61	20
Part	Highest	32	10
No Gear Determined (Max. Requirement <78)		2	1
		311	100
Manual Transmission			
Full	2	1	1
	3	13	12
	4	82	77
	5	0	
Part	2	0	
	3	1	1
	4	8	8
	5	0	0
No Gear Determined (Max. Requirement <78)		1	1
		106	100

DATE

FILMED

8